29-October-2001 14:45
Miller, Steven
1441
21-Apr-1958

S:118 L:1.6
Type Hand-R

Zoom

Vergrößerungstyp

Numerisch
Zu den Blenden
Max. Auflösung
Lebensgröße

Vergrößerungsfaktor   3.95

1   1.4   2

- 10.0
- 9.0
- 8.0
- 7.0
- 6.0
- 5.0
- 4.0
- 3.0
- 2.0
- 1.0
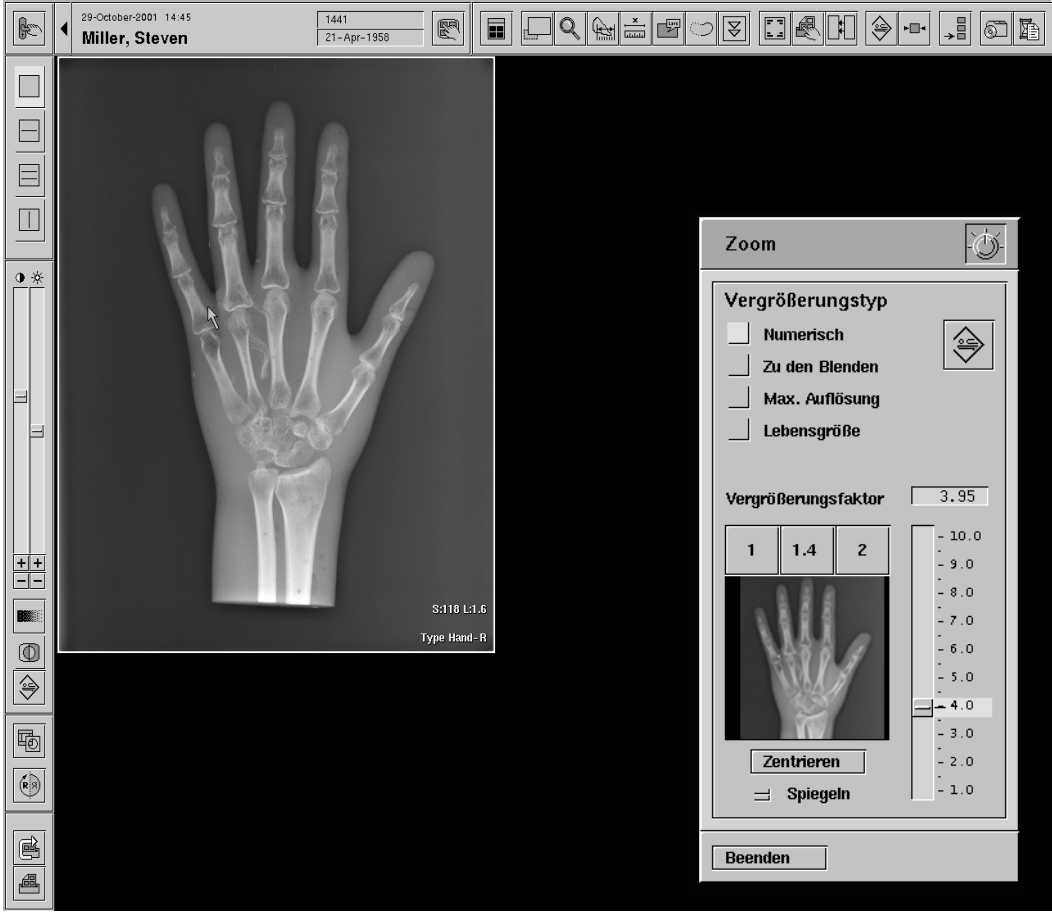
Zentrieren

Spiegeln

Beenden

INSTRUCTIONS FOR USE

EasyVision RAD Release 4.2 L5

WORKSTATION FOR IMAGE PROCESSING

Edition 6

English

PHILIPS

EasyVision RAD Release 4.2 L5

INSTRUCTIONS FOR USE

Edition 6

English

PHILIPS

PHILIPS

Overview

There is a detailed table of contents at the start of each chapter.

Chapter 1

Introduction 1-3

Philips Medical Systems December 2003

1 Introduction

1.1 What is EasyVision RAD?

EasyVision RAD is a workstation based on the UNIX® operating system for the processing and editing of digital X-ray images. As a variant of the EasyVision workstation, it operates on the basis of EasyVision software, additionally offering the 'PCR' (Philips Computed Radiography) radiological application. The result is a unit specially designed for the processing of digitised cassette exposures within the PCR system. In the PCR system, EasyVision RAD is used both as a single-station computer as well as on a Client Server basis in multi-station systems. It is the central image processing station between the PCR image readers, the PCR terminals and a laser camera (hard copy), permitting the following functions:

- processing and interim storage of digital images
- display and processing of images on a screen
- automatic and manual printing
- storing images on storage disks (MOs) or CDs and loading them
- transferring images to other DICOM partners within a clinic network

Fig. 1.1 EasyVision RAD workstation

By coupling this with the image acquisition system 'DigitalDiagnost' or with DSI systems, image processing can be further centralised within radiology.

EasyVision RAD assists the user by means of a simple to operate, graphic user interface and a high degree of automation in routine processing. The display area on the screen is supplemented by a virtual display area (navigation), which optimises work with several screens and examinations.

1.2   Application information

1.2.1   User qualification

For working with EasyVision RAD, you must possess basic specialist knowledge of radiology, image-supported medical diagnostics and digital image processing. Before working with EasyVision RAD for the first time, you must be thoroughly instructed in its operation by no-one less qualified than a specialist trained by Philips.

Philips recommends that all users participate in special training for safe handling of this product. Further information on training sessions can be requested from your local Philips Customer Service.

⚠

DANGER   *Incorrect use of the image processing functions may produce image artefacts. Diagnostically relevant image information may then be suppressed or falsely displayed. You must have substantial knowledge of digital processing to change the default parameters within a processing protocol.*

1.2.2   Normal use

EasyVision RAD is used to process, display and output radiological images which have been made by means of cassette exposures and processed within the PCR system. This also applies to images transmitted via connection to 'DigitalDiagnost'. Images from other diagnostic units, such as the DSI, CT or MR systems, or other images imported via data media can only be correctly processed if the appropriate optional applications are installed. EasyVision RAD is not suitable for the processing and display of images generated on systems from other manufacturers or compressed using software from other suppliers.

1.2.3   Conformity

This Medical Device meets the provisions of the Medical Device Directive 93/42 EEC (93). If you have further questions regarding the applicable national or international standards, please address them to:

Philips Medical Systems DMC GmbH
Quality Assurance Department
Roentgenstrasse 24
D-22335 Hamburg
Fax: (+49) 40/50 78-21 47

CE 0123

1.3   About these Instructions for Use

1.3.1   Update

These Instructions for Use are a modular component of the PCR system Instructions for Use. The EasyVision RAD workstation is further developed as a system unit independent of the other PCR system components. For an update, you will receive the Instructions for Use as a separate module. Please exchange this for the old module in the system Instructions for Use.

1.3.2   Scope of these and other Instructions for Use

These Instructions for Use describe the basic functionality of the EasyVision RAD workstation and the 'PCR' radiological application. EasyVision RAD can be supplemented by optional applications which are not part of these Instructions for Use. If your EasyVision RAD computer is equipped with software options, you will also receive the Instructions for Use of 'EasyVision RAD Software Options'.

Optional applications (EasyVision RAD)
R/F display
Processing of vascular images
Bolus Chase Reconstruction
Colon overview image
Spine Reconstruction
Leg Length Measurements
NetView

1.3.3   Conventions used in these Instructions for Use

These Instructions for Use utilise the following conventions to better distinguish between various types of information.

⚠

DANGER   *This is how warnings are labelled to indicate high-priority information. You must always follow these warnings to avoid causing damage to the equipment or data loss.*

NOTE   *This is how a note is labelled to draw your attention to a certain point or to make working with the equipment easier.*

1   The individual steps in a set of instructions are numbered.
   • The sequence of steps are labelled with a point.

Terms that are also used in the software are emphasised by quotation marks, e.g. the 'Print' window.

Chapter 2

Safety instructions 2-3

2   Safety instructions

⚠

DANGER   *Please observe the following information.*

2.1   General safety instructions

This manual is designed to make it possible for you to operate the equipment described safely. You should use this equipment only in accordance with the safety instructions contained in this manual and not use it for purposes other than for which it is intended. This unit must be operated only by specially qualified persons instructed in its use.

In the United States, Federal law restricts this device to sale, distribution, and use by or on the order of a physician.

It is always the user who is responsible for complying with the regulations which apply to the installation and operation of equipment.

You must never use the equipment if it has any electrical, mechanical or radiation defects. This particularly applies to malfunctioning indication, warning and alarm devices.

If the user wishes to connect the equipment up to units, components or assemblies other than those described in the section entitled "Compatibility", and if safe combination with such units, components or assemblies is not apparent from the technical data, the user must, by consulting the manufacturers concerned or an expert, ensure that safety of the patient, operating staff and the environment is not affected by the proposed combination.

Philips is responsible for the safety features of its products only if maintenance, repairs and modifications are carried out by Philips or persons explicitly authorized by Philips to do so.

As with any piece of technical equipment this equipment must be operated properly and it must be serviced and attended to properly at regular intervals in accordance with the section entitled "Maintenance".

If you fail to operate the equipment properly or if the user fails to keep it properly maintained, Philips cannot be held liable for any resulting malfunctions, damage or injuries.

Safety circuits must be neither removed nor modified. You may remove or open parts of the housing only if you are instructed to do so in this manual.

2.1.1 Electrical safety

This equipment complies with IEC 60950. It must not be placed in the vicinity of patients.

To ensure reliable operation of your Philips equipment and protect it from overheating, openings must not be blocked or covered. The equipment should never be placed near a radiator or a heat register.

This equipment should be connected to an uninterruptible power supply to avoid damage to the database and data loss in case of power failure.

This system contains high voltage components. Only qualified technicians should remove the covers from these components.

2.2 Special safety precautions

2.2.1 Artefacts

Incorrect use of the image processing functions may produce image artefacts. Diagnostically relevant image information may then be suppressed or falsely displayed. **You must have substantial knowledge of digital processing to change the default settings within a processing protocol.**

2.2.2 Data loss

Never turn off the EasyVision RAD workstation at the mains switch if applications are still loaded. The database can be damaged in this way. Before switching off the workstation, you must end the application programme. For further information on this topic refer to the section „Switching off the workstation" on page 4-4.

2.2.3 Deviations in brightness in multiple exposures

Images which are processed using the UNIQUE technique may be exposed on the cassette only as single exposures. If a cassette is exposed more than once, deviations from the brightness of a single exposure may arise when processing using the UNIQUE technique. These deviations result from the unexposed areas between the collimations, which appear on the image plate in the case of multiple exposures.

2.2.4 Screen settings

When installing the PCR system, the display of grey levels was calibrated on the screen and on the film hard copy. To maintain the conformity, the contrast and brightness settings on the screen should not be changed. The screen display is best in an environment with soft lighting. You can correct calibrates the screen. For further information on this topic refer to the section „Screen settings" on page 4-14.

2.2.5 Cleaning and care

Ensure that no liquids are allowed to enter the equipment as they may cause short circuits or corrosion to components. The keyboard, mouse and screen should be cleaned with a damp cloth and a mild detergent only. Other cleaning agents and disinfectants can produce explosive mixtures of gases. Please follow the relevant instructions.

2.2.6 Mechanical safety

Never transport the unit while in operation. Switch off before transporting and ensure that all peripheral parts of the system (monitor, mouse, keyboard, connecting leads etc.) are transported seperately and safely.

2.3 Disposal

Philips manufactures state-of-the-art X-ray equipment in terms of safety and environmental protection. Assuming no parts of the system housing are opened and assuming the system is used properly there are no risks to persons or the environment.

To comply with regulations it is necessary to use materials which may be harmful to the environment and therefore have to be disposed of in a proper manner.

For this reason you must not dispose of the X-ray equipment together with industrial or domestic waste.

Philips
- supports you in disposing of the X-ray equipment described in a proper manner
- returns reusable parts to the production cycle via certified disposal companies and
- thus helps to reduce environmental pollution.

Consequently, do contact your Philips Service Organisation in full confidence.

Philips Medical Systems December 2003

2.4 Electromagnetic compatibility (EMC)

In accordance with its intended use, this electronic apparatus complies with the law governing EMC, which defines the permitted emission levels from electronic equipment and its required immunity against electromagnetic fields.

Nevertheless, it is not possible to exclude with absolute certainty the possibility that radio signals from high-frequency transmitters, e.g. mobile phones or similar mobile radio equipment, which themselves conform to the EMC regulations, may influence the proper functioning of electromedical apparatus if such equipment is operated in close proximity and with relatively high transmitting power. Therefore, operation of such radio equipment in the immediate vicinity of electronically controlled medical apparatus should be avoided to eliminate any risk of interference.

Explanation

Electronic apparatus that satisfies the EMC requirements is designed so that under normal conditions there is no risk of malfunction caused by electromagnetic interference. However, in the case of radio signals from high-frequency transmitters with a relatively high transmitting power, the risk of electromagnetic incompatibility when operated in close proximity to electronic apparatus cannot be totally ruled out.

In unusual circumstances unintended functions of the apparatus could be initiated, possibly giving rise to undesirable risks for the patient or user.

For this reason, all kinds of transmission with mobile radio equipment should be avoided. This also applies when the apparatus is in „standby" mode.

Mobile telephones must be switched off in designated problem zones.
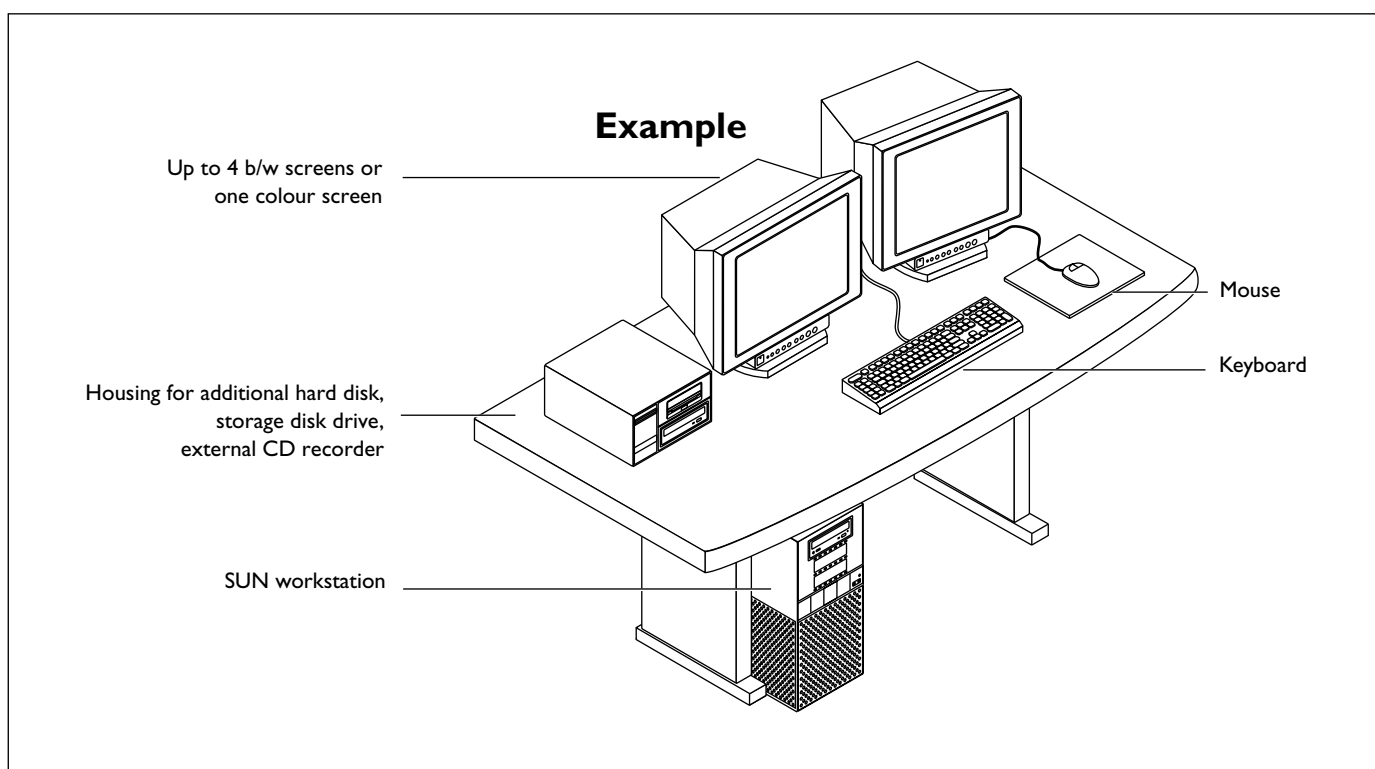
Chapter 3   System overview 3-3

3 System overview

3.1 Hardware

In the following sections, you will find information regarding the EasyVision hardware outfit and the PCR system configuration.

3.1.1 EasyVision RAD system

EasyVision RAD comprises different system components depending on the version. The illustration below is therefore provided only as an example. You can find a list of your system's components in the CE document.

Example

Up to 4 b/w screens or one colour screen

Housing for additional hard disk, storage disk drive, external CD recorder

SUN workstation

Mouse

Keyboard

Fig. 3.1 Example of an EasyVision RAD system

3.1.2   # External CD recorder

N O T E

- *The type of unit illustrated below is merely an example. Different CD recorders with similar controls, displays and indicators are also used.*
- *To avoid data loss, only use high-quality brand name CDs.*

The CD recorder is suitable for writable and rewritable CDs and also for reading CD-ROMs. The following CD types can be used:
- Storage capacity of 600 Mb to 700 Mb (diameter: 120 mm)

The CD recorder operates in the background when writing CDs and when calling up images.
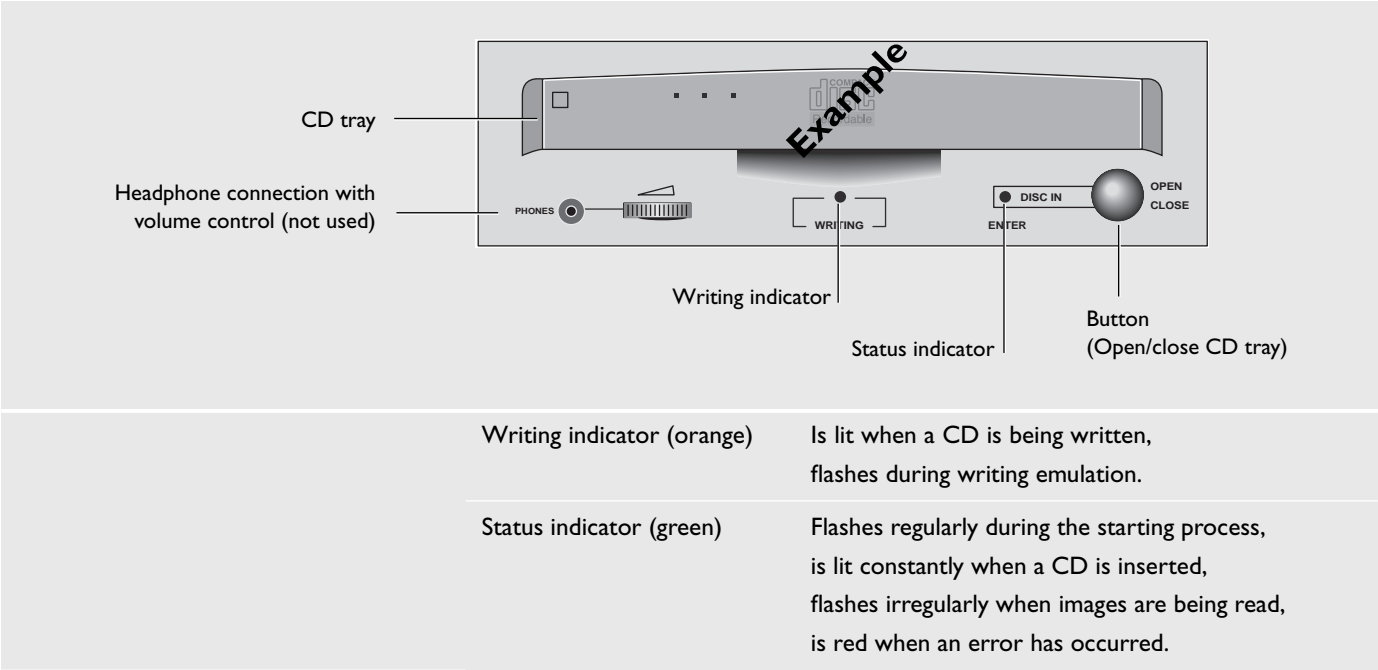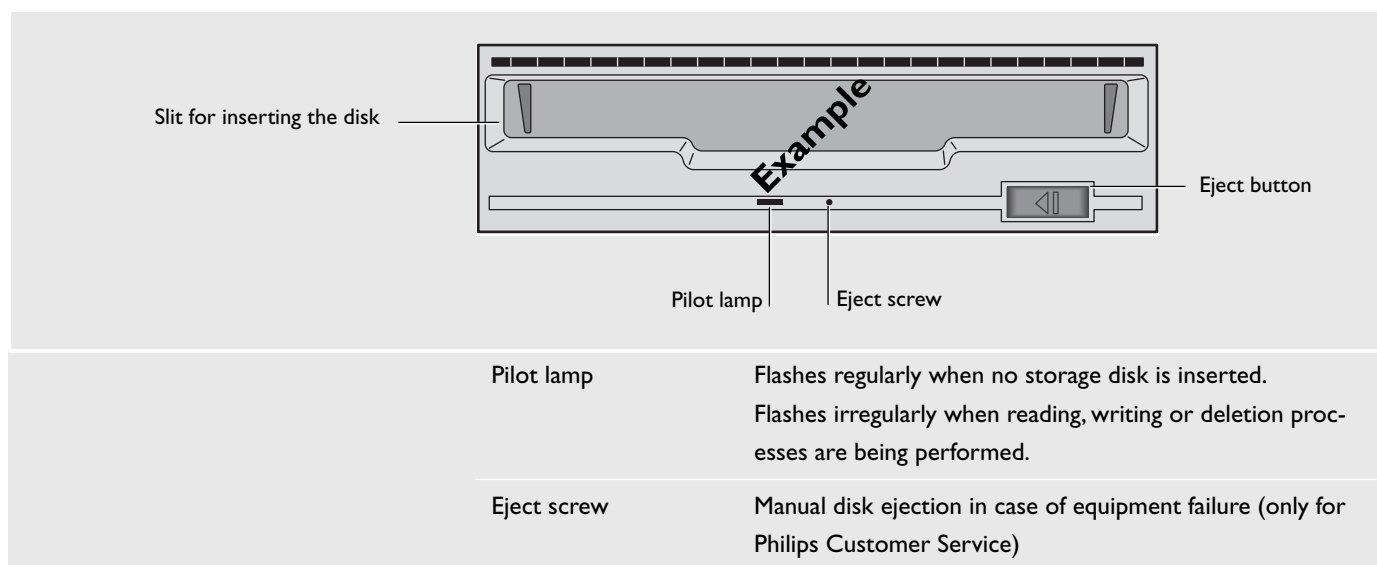
CD tray

Headphone connection with volume control (not used)

PHONES

WRITING

DISC IN
ENTER

OPEN
CLOSE

Example

Writing indicator

Status indicator

Button
(Open/close CD tray)

Writing indicator (orange)	Is lit when a CD is being written, flashes during writing emulation.
Status indicator (green)	Flashes regularly during the starting process, is lit constantly when a CD is inserted, flashes irregularly when images are being read, is red when an error has occurred.

Fig. 3.2 Example of a CD recorder

3.1.3   Disk drive for storage disks

NOTE   *The type of unit illustrated below is merely an example. Different disk drives with similar controls, displays and indicators are also used.*

This disk drive is suitable for rewritable storage disks (MOs) size 5.25". The storage disk capacity is approx. 320 Mb per side; this is sufficient for approx. 300 images (matrix: 1,024 x or 1,024) or 1,200 images (matrix: 512 x 512). Approx. 10 to 50 CR images can be stored on one MO side, depending on the cassette size and the selected resolution.

The disk drive performs all reading and writing processes in the background.

Slit for inserting the disk

Example

Eject button

Pilot lamp   Eject screw

| Pilot lamp | Flashes regularly when no storage disk is inserted. Flashes irregularly when reading, writing or deletion processes are being performed. |
| Eject screw | Manual disk ejection in case of equipment failure (only for Philips Customer Service) |

Fig. 3.3 Example of a disk drive for storage disks

3.1.4   Keyboard and special key functions

N O T E   *The illustration below shows an English/American keyboard. Different national keyboards with different keys and designations are also used.*

A detailed description of all function keys can be found in the documents for your SUN® computer. In the following picture, an English/American keyboard is shown. Only the keys with special functions are mentioned.
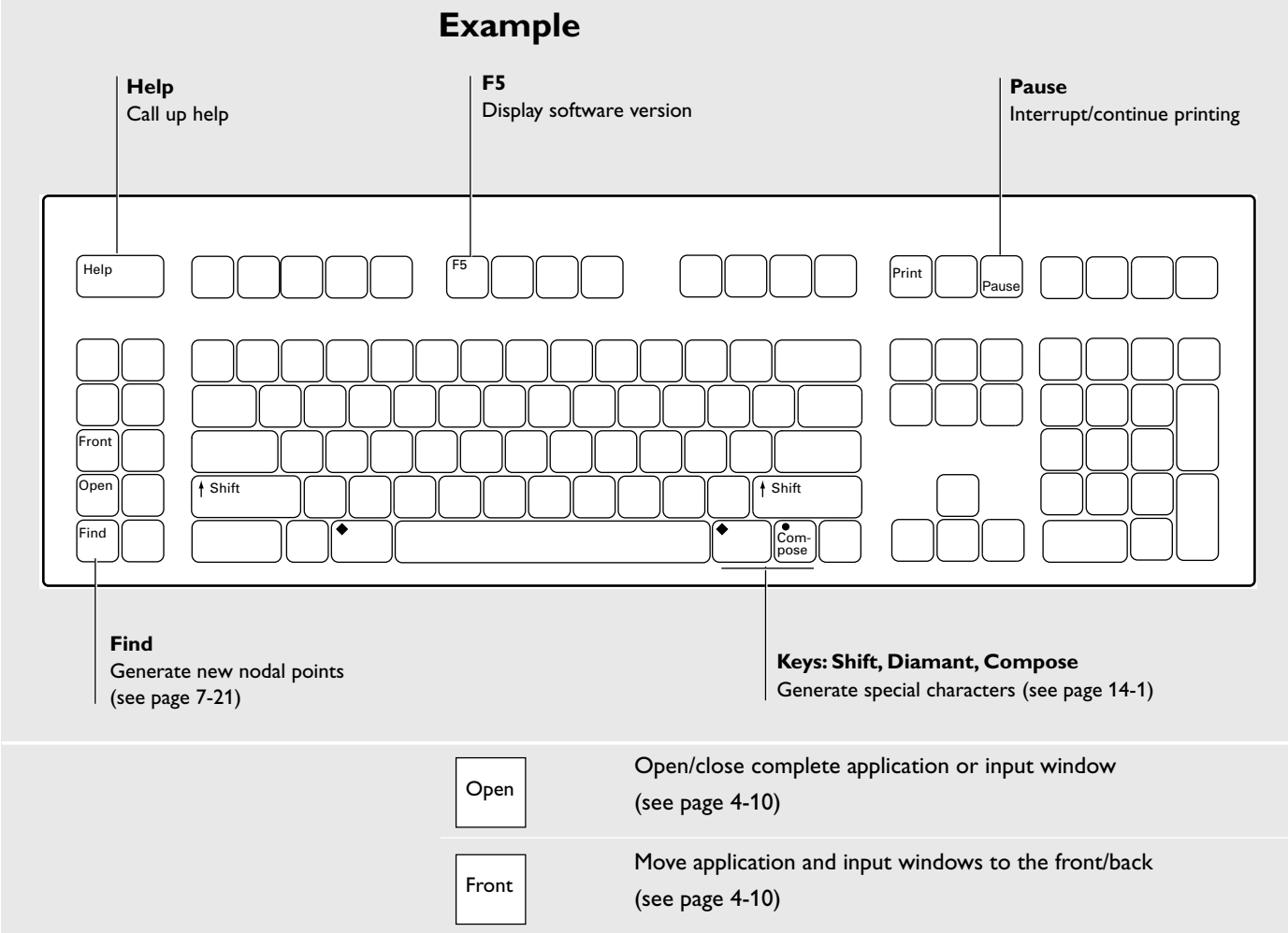
Example

Help
Call up help

F5
Display software version

Pause
Interrupt/continue printing

Find
Generate new nodal points
(see page 7-21)

Keys: Shift, Diamant, Compose
Generate special characters (see page 14-1)

Open	Open/close complete application or input window (see page 4-10)
Front	Move application and input windows to the front/back (see page 4-10)

Fig. 3.4 Example of a keyboard

3.1.5 The mouse and its buttons
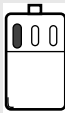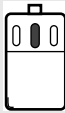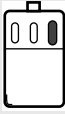
With the help of the mouse, all functions - with only a few exceptions - can be performed on the graphic user interface. Clean the mouse ball at regular intervals if it no longer functions perfectly.
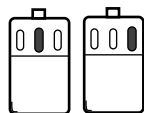
Mouse actions

If it is necessary to click the right or centre mouse button, the Instructions for Use will additionally call your attention to this with a symbol.

Terms	Handlung
Click	Briefly press the left, centre or right mouse button.
Double-click	Press the left mouse button twice quickly.
Drag	Click on an object and hold down the mouse button

Button assignment

Button	Action	Application examples
Left mouse button	Click	Activates functions, selects/highlights objects
	Drag	Changes window position, moves objects
	Double-click	Displays images
Centre mouse button	Click	Adds or deselects selected objects
	Drag	–
	Double-click	–
Right mouse button	Click	Calls up background menus, displays list selection
	Drag	–
	Double-click	–

3.1.6   PCR system configurations

The illustrations below show examples of two system configurations of varying complexity.

Example 1: Basic PCR system

In the following configuration, the EasyVision RAD workstation functions as a single-station computer.

PCR terminal

Image reader

Laser imager (printer)

EasyVision RAD workstation
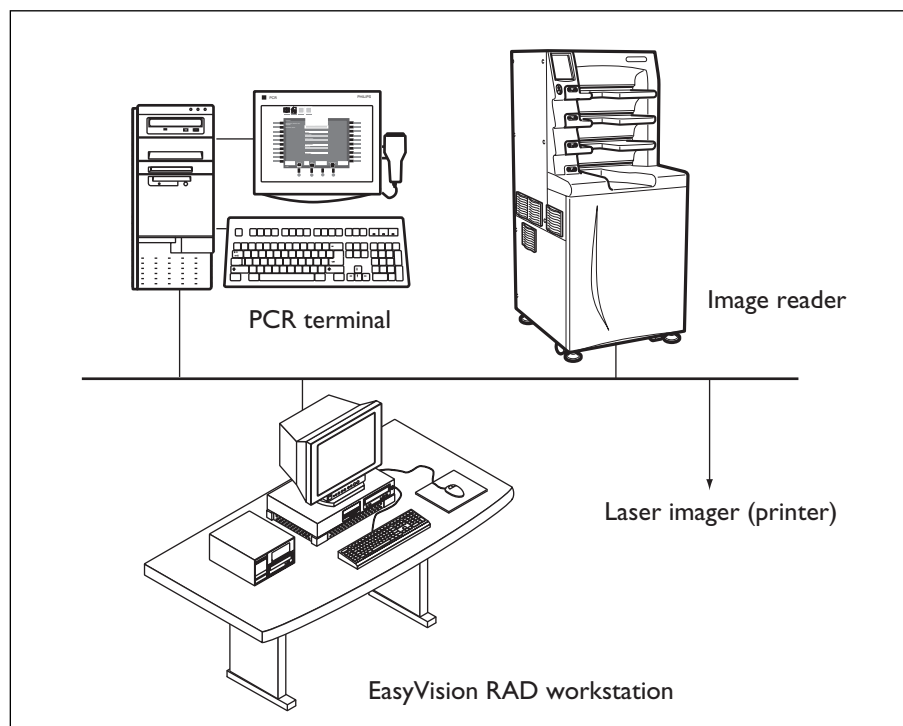
Fig. 3.5 Basic PCR system

Example 2: Complex PCR system

Within complex PCR systems, the connected EasyVision RAD computers operate in a client-server architecture.
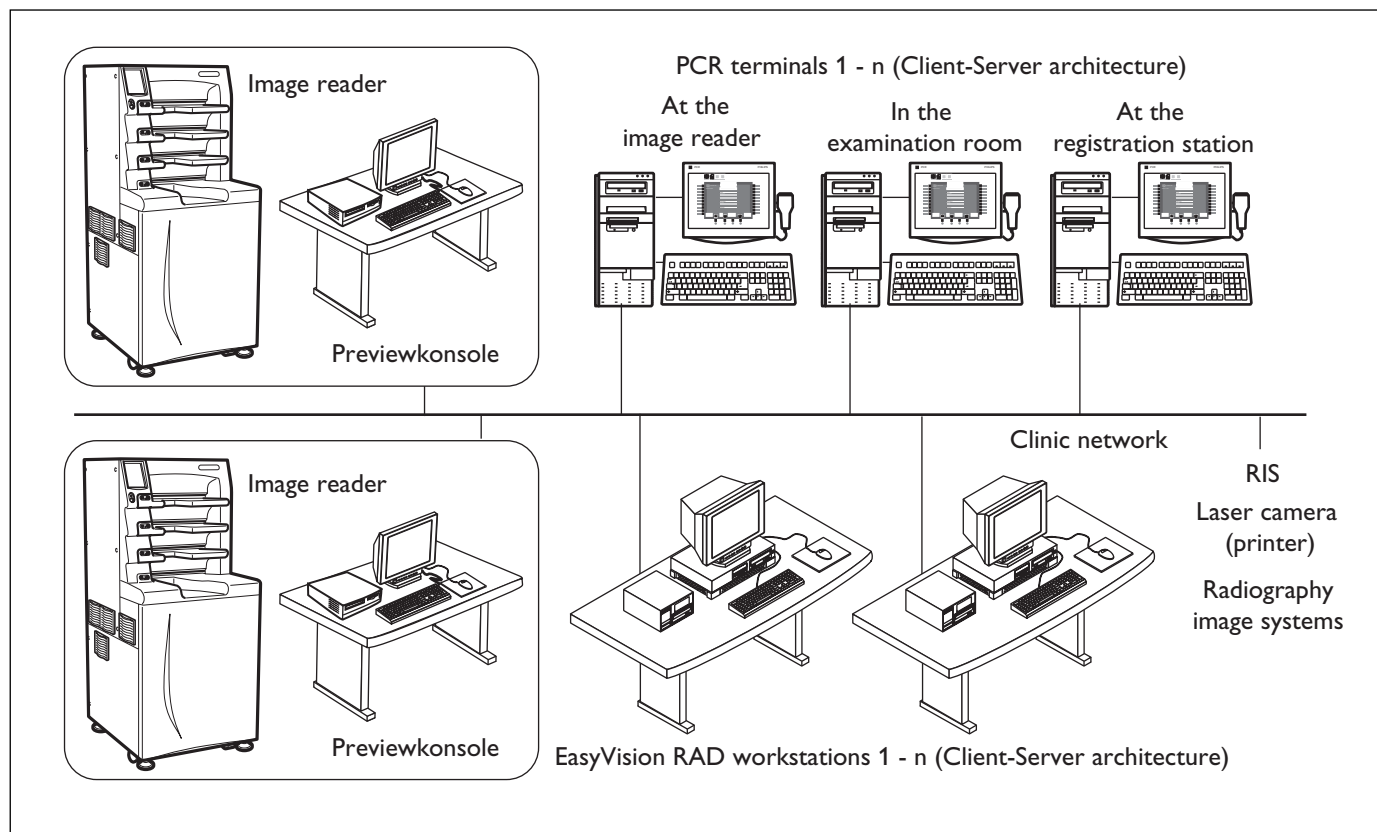
Fig. 3.6 Complex PCR system

Differences between EasyVision RAD computers

Type	Special features
Server	Has a central database on the internal hard disk
Client	Has no database of its own and therefore no functions relative to its customization; access to the central database via the Server.
Single-station computer	The database is on the internal hard disk.

3.2   Software

3.2.1   Programme areas

Via the 'Packages' window, the following programme areas can be called up. Optional applications have not been taken into consideration.
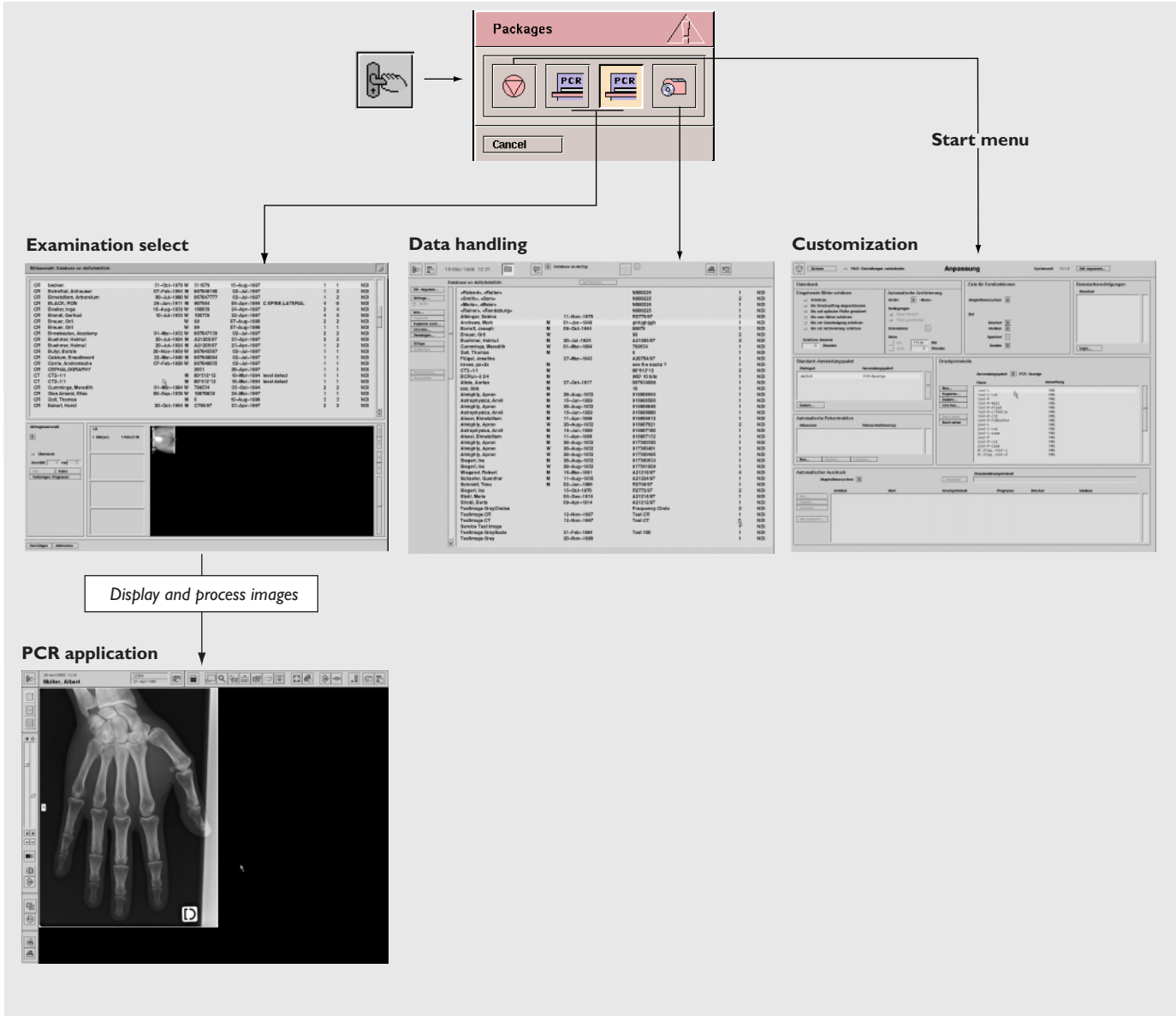
Fig. 3.7 EasyVision RAD programme areas

Programme area	Application
Examination select	Selects examinations (see page 5-11)
PCR application	Displays, processes and prints system-internal CR images (Computer Radiography). The PCR application is duplicated. Both workspaces can be used independently of one another.
Data handling	Transfers, stores and prints examinations as well as managing storage disks and CDs (see page 9-3)
Customization	Programme area for customizing the system parameters for technical personnel (see page 11-3)

3.2.2   PCR application

The illustration below shows the user interface for the PCR application. From here you have access to all further function windows for the display, processing and output of CR images.
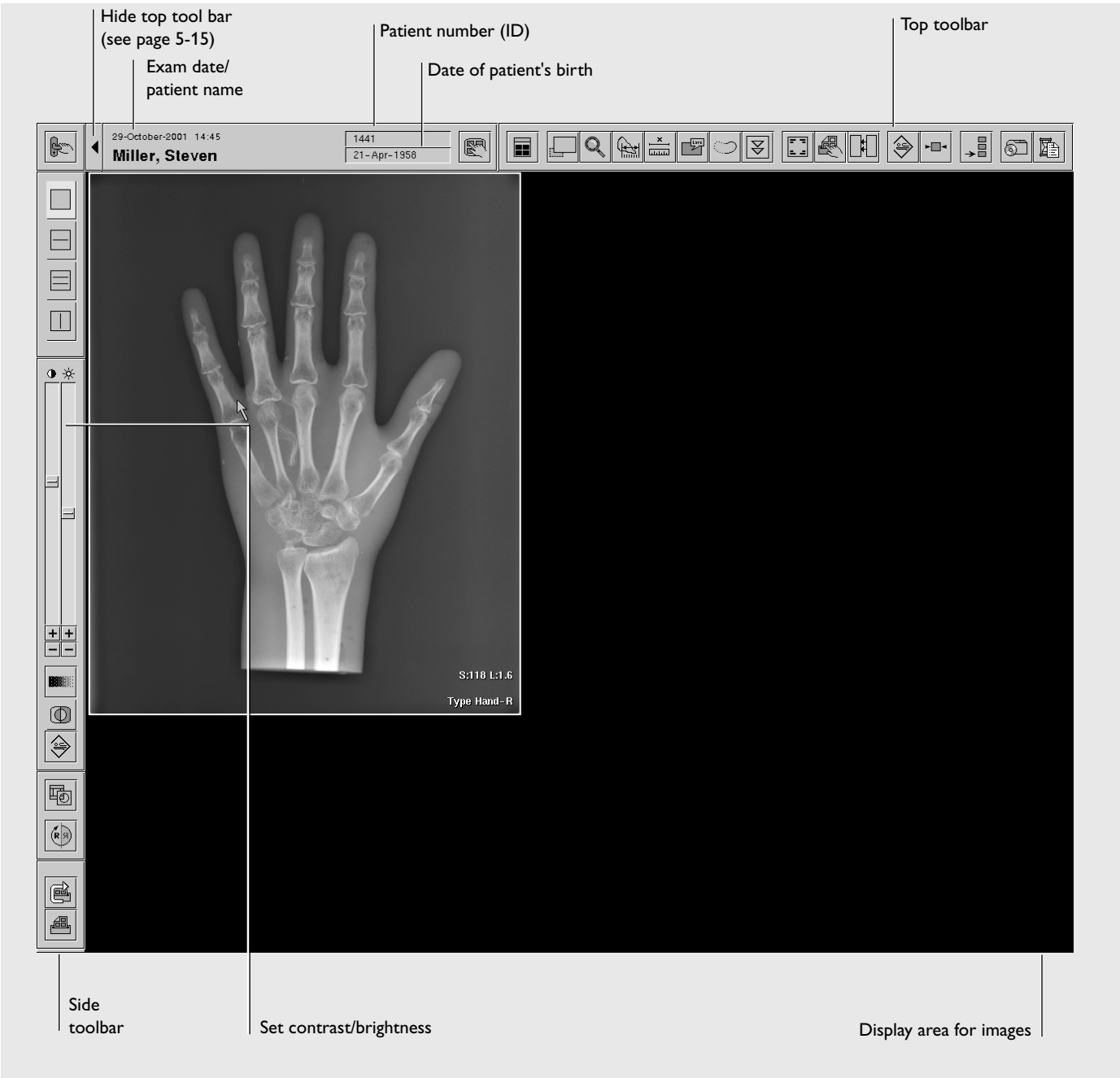
Fig. 3.8 PCR application

Function	Application	Function	Application
Top toolbar			
	Changing programme areas (see page 4-6)		Select/edit processing protocols (see page 6-5)
	Calls up image selection (see page 5-5)		Display data on the display surface (see page 5-29)
	Calls up the 'Navigation' window to control the virtual display area (see page 5-17)		Calls up printing dialogue for optional film composition (see page 8-7)
	Enlarge/reduce image (see page 7-16)		Combine images (see page 7-24)
	Displays magnification (see page 7-13)		Global reset of all processing functions on the side and top toolbars (see page 7-4)
	Perform measurements (see page 7-20)		Global reset of all processing functions and also closes all function windows
	Calibrate images (see page 7-18)		Select new exposures from the image reader (see page 5-15)
	Generate labels (see page 7-36)		Calls up data handling (see page 9-3)
	Call up dialog for setting image processing parameters (see page 6-3)		Control the system status (see page 10-5)
Side toolbar			
	Displays area not split (see page 5-14)		Resetting the image display group function: All contrast and brightness settings including function curves, parameters for image processing and inversion (see page 7-4).
	Display area split into two horizontal segments (see page 5-14)		Adjust electronic shutters (see page 7-5)
	Display area split into three horizontal segments (see page 5-14)		Rotate/invert images (see page 7-11)
	Display area split into two vertical segments (see page 5-14)		Prints entire examination (see page 8-6)
	Adjusts function curves for contrast and brightness (see page 6-18)		Printing dialogue for image output with print formats (see page 8-17)
	Inverts image (reversed black/white)		

3.2.3   Software options

Optional functions within the PCR application

The following table shows optional functions within the PCR application. The symbol buttons for options not installed appear grey and cannot be activated.

Options	Definition
Navigation	Control of the virtual display area
Print	Image output with print protocols on film or paper
Communication	
DRR	Dynamic Range Reconstruction, optional software package for image processing.
EasyStore	Connection of CD recorders and MO drive
RAD-Ortho package	Production of composite images and measurements of the spine.

Optional applications

The following optional applications are available for the EasyVision RAD workstation.

Optional applications (EasyVision RAD)
R/F display
Processing of vascular images
Bolus Chase Reconstruction
Colon overview image
Spine Reconstruction
Leg Length Measurements
NetView

3.2.4　　# Various controls

The following sections describe the essential controls for the software.
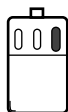
Context menus

Various context menus can be called up by clicking with the **righ**t mouse button. Some functions are **only** available via the context menu. You can call up the most extensive context menu by clicking the **right** mouse button on a displayed image.
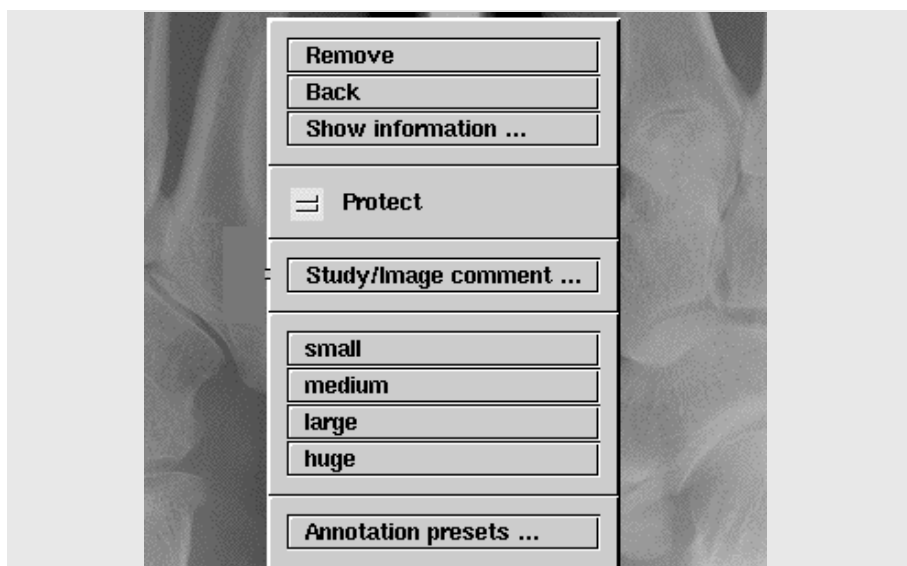
Fig. 3.9　Context menu on the display area

If operation via a context menu is possible or necessary, your attention will be called to this in the following pages by a note.

List selection

A list selection is labeled with a spring symbol. Click this with the **right** mouse button and hold this down to display the list.
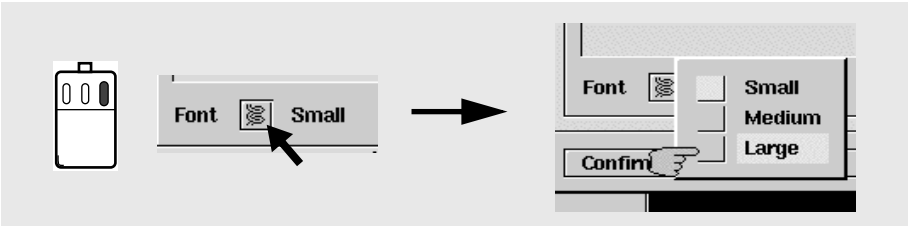
Fig. 3.10 List selection

Using the **left** or **right** mouse button, select the required list point. You can flip through the individual list points without displaying the list. To do this, click with the **left** mouse button on the spring symbol.

Various buttons

Symbol buttons
Using the **left** mouse button, click on a symbol button to carry out a function or call up a function window.

When a function window or application is called up, the symbol button appears to be depressed. By clicking again, the window/application is closed.

EIf a symbol button appears without contrast, the function is not able to be performed under the given circumstances, or it has not been installed in your EasyVision RAD workstation.

Buttons
Buttons contain a function term.
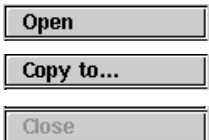
With the **left** mouse button, click on a button to carry out a function.

Buttons which open a function window are labelled with an ellipsis (...).

If a button appears without contrast, the function cannot be performed under the given circumstances.

Various option lists

With the help of option lists you can activate or deactivate specific functions. There are option lists with single or multiple choice.
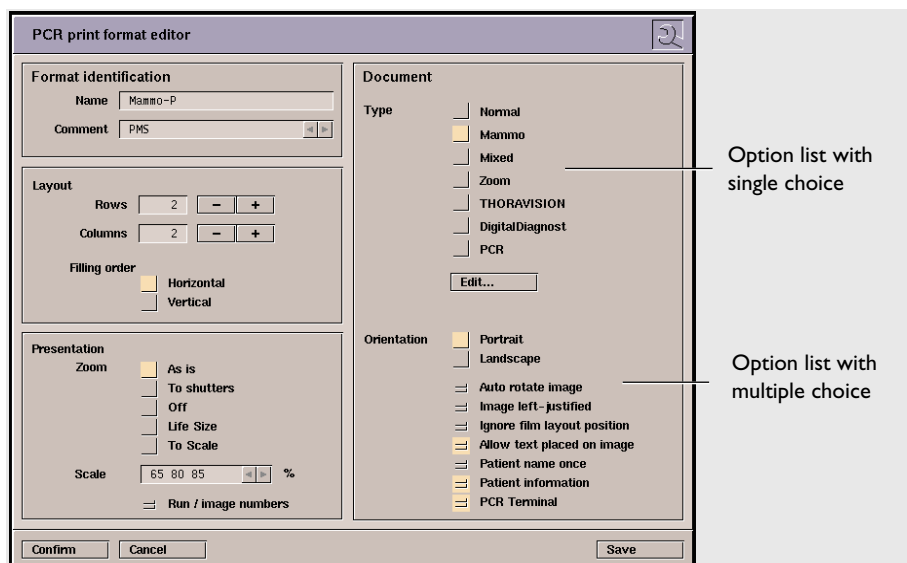
Fig. 3.11 Option lists

Entry fields

Text entry fields

• Marking text
With the left mouse button, drag or double-click (to mark a word) or click three times (to mark a line).

Numeric entry fields
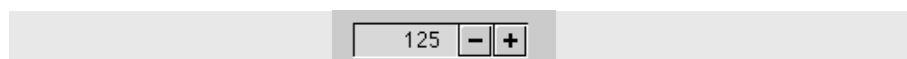
• Marking a figure
With the left mouse button drag or double-click (to mark a figure).

• Applying an entry
Press the Enter key.

Slider control

The slider control in the illustration below makes it possible to set the lower and upper limits and move the entire range (centre slider).
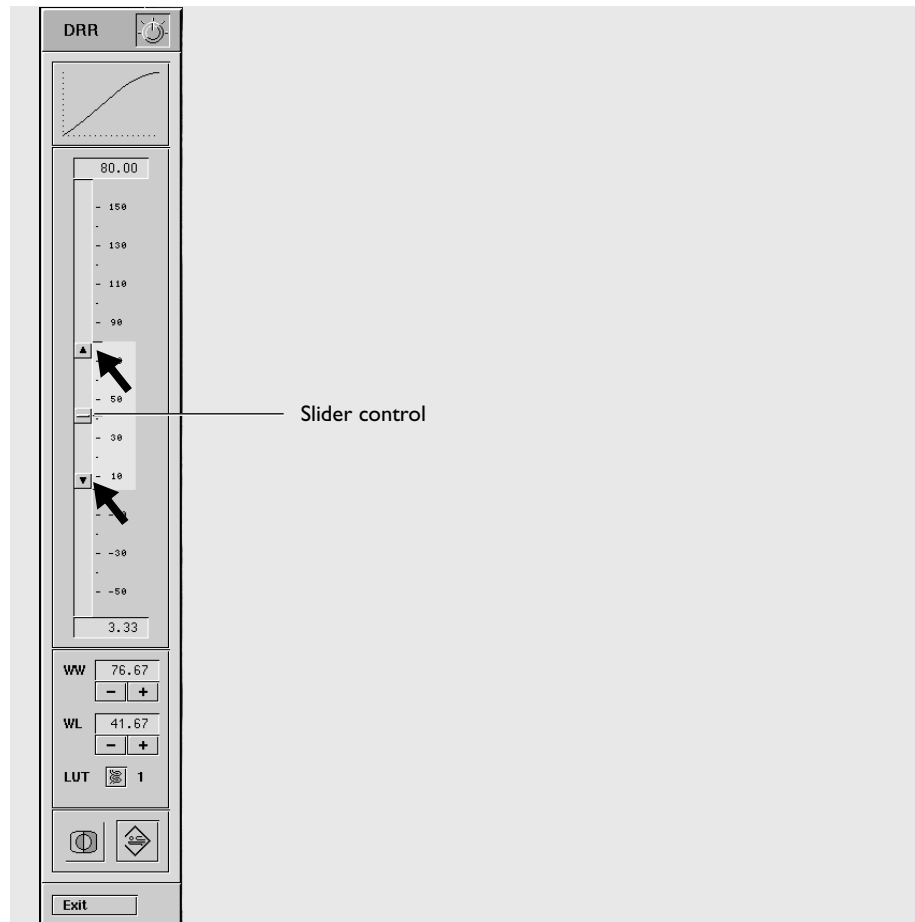
Fig. 3.12 Slider control for adjusting the function curve for contrast and brightness
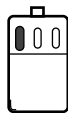
Moving the limits asymmetrically
• With the **left** mouse button, drag the upper or lower slider
– or –
• using the **left** mouse button, click in the slider path.

The centre slider automatically moves to the new centre of the range.
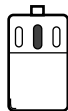
Moving the limits symmetrically
• Using the **centre** mouse button, drag the upper or lower sliders
    – or –
• using the **centre** mouse button, click in the slider path.

Here the position of the centre slider remains unchanged.

Moving the range
• Using the **left** or **centre** mouse button, drag the centre slider.

Mouse pointer symbols

Function	Application
	Normal mouse pointer 3-19
	Position objects, carry out measurements
	Move elements
	Make a selection
	Pay particular attention to the next function
	Processing in progress, please wait

Chapter 4

Basic working techniques 4-3

4   Basic working techniques

The following sections in this chapter describe the basic working techniques which you may always use for various tasks.

4.1   Switching on the workstation

N O T E   *If you switch on the entire PCR system, use the following sequence:*
1. Image reader 2. PCR terminal 3. EasyVision RAD workstation (first the server, then the clients).
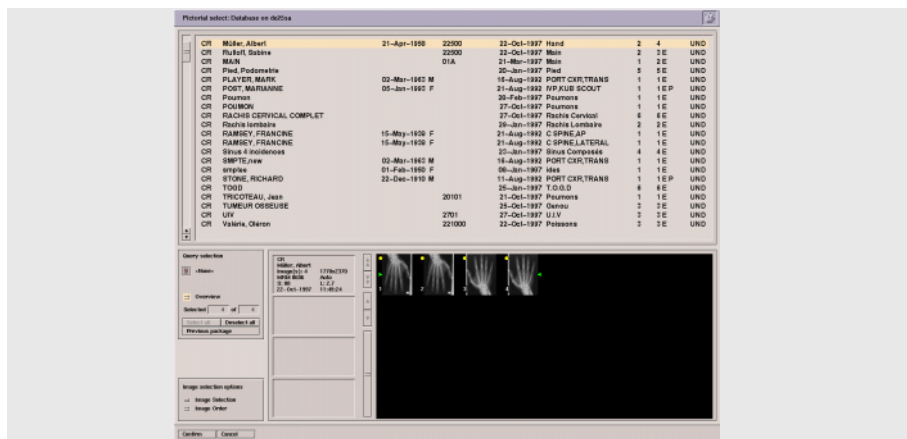
Switching on the workstation

1   Depending on your system's outfit, switch on the workstation using the mains switch on the workstation housing or using the mains switch on the junction box.
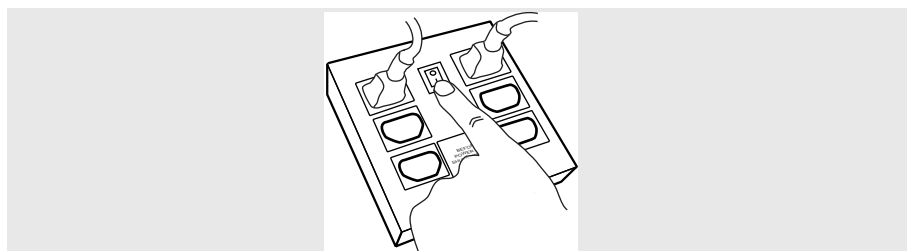
Fig. 4.1 Junction box

• The necessary programmes are booted. After a short time, the following window appears.

Fig. 4.2 'Pictorial select' window

You may now select an examination for display. For further information on this topic refer to the section „Selecting examinations" on page 5-8.

4.2 # Switching off the workstation

The EasyVision RAD workstation is designed for continuous operation and is therefore usually not switched off. If you would like to switch off the workstation for specific reasons, always use the sequence described below.

⚠

DANGER • *Never switch the workstation off if an application is still loaded. The database may be damaged. Data may be permanently lost.*

NOTE • *Before switching off, check whether the workstation has completed all processing procedures that are performed in the background. You can find further information about this in the section 'Checking processing procedures' on page 10-5. Unfinished processing procedures are continued once the workstation is switched back on.*
• *When you switch off the entire PCR system, proceed in the following order: 1. Workstation (first the clients, then the server) 2. Image reader 3. PCR terminal.*
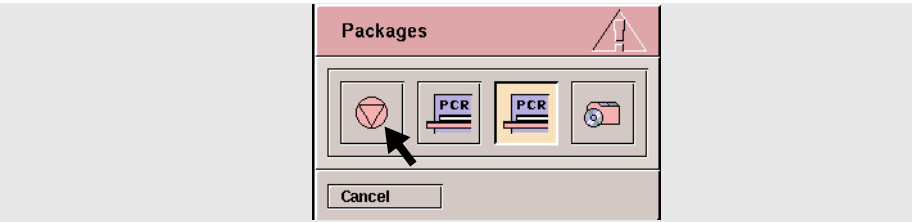
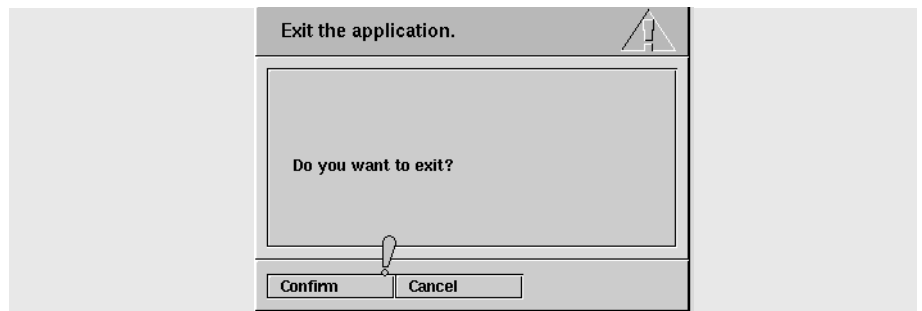*Switching off the workstation*

1 Click this symbol button.
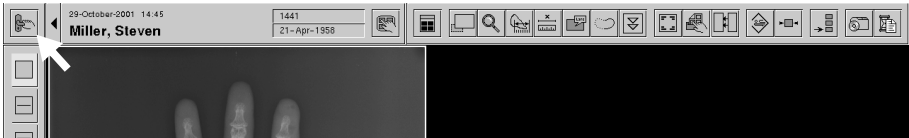
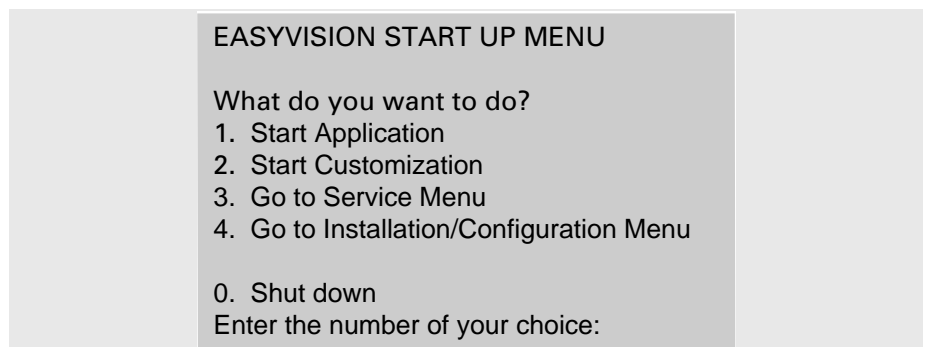• The following window appears.

Fig. 4.3 'Packages' window

2   Click on the Exit symbol.
 • The following window appears.

3   Click on 'Confirm'.
  • The following window appears.

EASYVISION START UP MENU

What do you want to do?
1. Start Application
2. Start Customization
3. Go to Service Menu
4. Go to Installation/Configuration Menu

0. Shut down
Enter the number of your choice:

Fig. 4.4 Start menu

4   Press the '0' key on the keyboard and confirm by pressing the 'Enter' key.
  • The shutdown routine is started. Various messages appear. When the shutdown routine is finished, the final 'OK' message appears.

5   Depending on your system's equipment, switch off the workstation using the mains switch on the workstation housing or with the mains switch on the junction box.
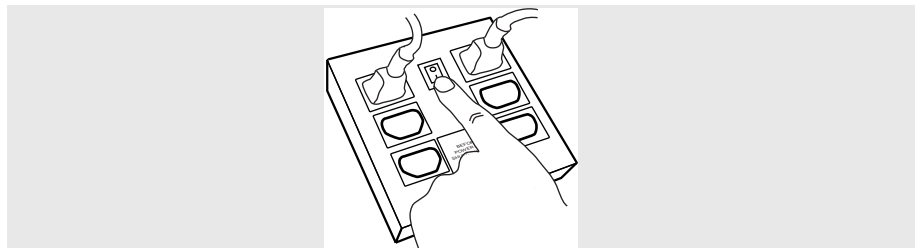
Fig. 4.5 Junction box

The workstation has been switched off properly.

4.3   Selecting applications

During a work session, you can change between various applications. You have two PCR applications available which can be used independently of one another. When changing to another application, the previous one remains in the same condition in which you left it.

NOTE   *If applicable, the symbols for optional applications appear in the 'Packages' window. Optional applications are described in the Instructions for Use for 'EasyVision RAD Software Options'.*
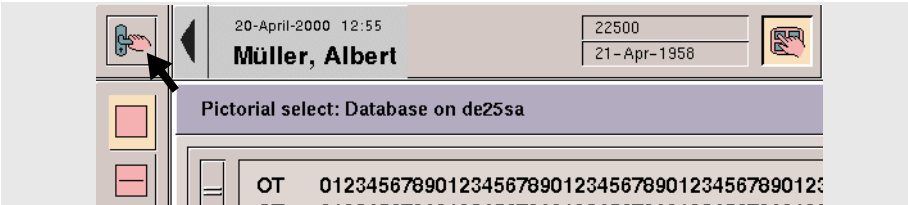
Selecting an application

1   Click on this symbol button.

When the 'Pictorial select' window is displayed, move it by dragging with the left mouse button and then click on the symbol button.

•   The following window appears.

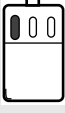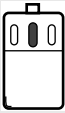|	Exit PCR application/call up Customization
	Call up the first PCR application ('Pictorial select' window appears first)
	Call up the second PCR application
	Call up 'Data handling' application

Fig. 4.6 'Packages' window

2   Call up the required application by clicking with the mouse.

The application selected is displayed.

4.4   Techniques for selecting objects

This section describes what techniques you can use to select and mark objects. Here, the mouse buttons generally have the following functions.

Button	Application
	Left mouse button • Exclusive choice of a single object • Unmark all marked objects
	Centre mouse button • Mark several selected objects • Unmark individual marked objects

4.4.1   Marking in database indexes

In the data directories for 'Pictorial select' and in the 'Data handling' application, you can select examinations by marking in order to use specific functions.
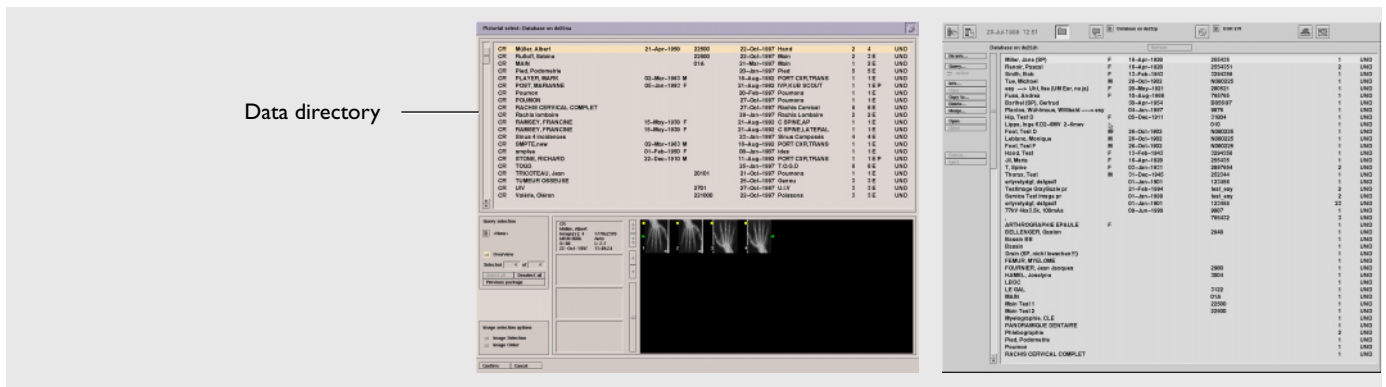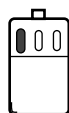
Data directory

Fig. 4.7 Data directories in 'Pictorial select' and 'Data handling'

Left mouse button

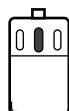**1** By clicking with the left mouse button, you mark a **single data level**.

CR	Sander, Jil	04-Jan-1956	F	123654789	D. Lind	1 2	P	NDI
CR	Miller, Jane	04-Jan-1956	F	123654789	D. Lind	2 2	E	NDI
CR	Smith, Bob	06-Jul-1962	M	567654732	D. Lind	1 1		NDI

2 By dragging with the left mouse button, you mark **several data levels** listed one after the other in the data directory.

CR	Sander, Jil	04-Jan-1956	F	123654789	D. Lind	1 2	P	NDI
CR	Miller, Jane	04-Jan-1956	F	123654789	D. Lind	2 2	E	NDI
CR	Smith, Bob	06-Jul-1962	M	567654732	D. Lind	1 1		NDI

3 To unmark **all data levels**, click with the left mouse button outside the marking.

CR	Sander, Jil	04-Jan-1956	F	123654789	D. Lind	1 2	P	NDI
CR	Miller, Jane	04-Jan-1956	F	123654789	D. Lind	2 2	E	NDI
CR	Smith, Bob	06-Jul-1962	M	567654732	D. Lind	1 1		NDI

Centre mouse button

1 By clicking with the centre mouse button, you mark **several data levels** that are not listed one after the other in the data directory.

CR	Sander, Jil	04-Jan-1956	F	123654789	D. Lind	1 2	P	NDI
CR	Miller, Jane	04-Jan-1956	F	123654789	D. Lind	2 2	E	NDI
CR	Smith, Bob	06-Jul-1962	M	567654732	D. Lind	1 1		NDI

2 To unmark **single data levels**, click with the centre mouse button on a marked data level.

|									
CR	Sander, Jil	04-Jan-1956	F	123654789	D. Lind	1 2	P	NDI
CR	Miller, Jane	04-Jan-1956	F	123654789	D. Lind	2 2	E	NDI
CR	Smith, Bob	06-Jul-1962	M	567654732	D. Lind	1 1		NDI

4.4.2   ## Selecting in the display area

You can select displayed objects, such as images and graphic objects, in the display area in order to apply certain functions. The objects selected are marked with a white frame in the display area. When the 'selection order' function is activated (see page 5-12), a selection number appears for the images. It indicates the order in which the corresponding image has been selected. The images are also incorporated in the film layout in this order. In the example below the image displayed was marked first (1).

The selection numbers are updated automatically whenever the order changes by repeated clicking. However, they are not shown in the optional virtual display area. To establish what selection number an image has here, the appropriate segment must be displayed.

White marking frame

Selection number

'Navigation' window/ virtual display area

Display area

Fig. 4.8 Marking images

To select and deselect you can use the objects in the display area or their pictures in the virtual display area in the Navigator. To do so, click with the following mouse buttons:
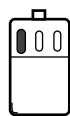
Left mouse button

1   By clicking with the left mouse button, you mark a **single image/graphic object.**

2   You unmark **all objects** by clicking with the left mouse button on the display area outside of objects.
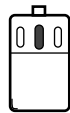
Centre mouse button

1   By clicking with the centre mouse button, you can mark **several selected images/graphic objects.**

2   To unmark **individual objects**, click with the centre mouse button on a marked object.

4.5   Working with windows

You can place the window of an EasyVision application in the background by pressing a button ('Open'), so that the operating system background becomes visible. In addition, other input windows of the operating system can be superimposed over the EasyVision application window by pressing a button ('Front'). These working techniques are not relevant for routine operation but they provide the technical personnel with access to the operating system.
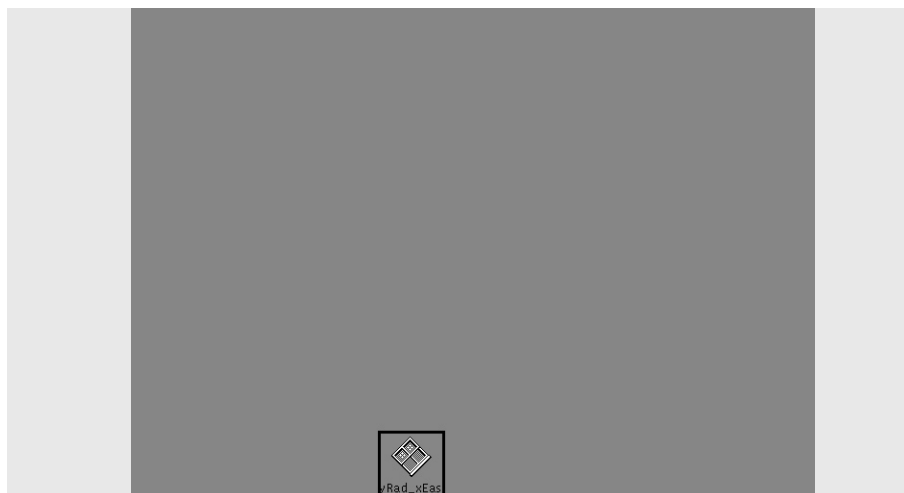
Fig. 4.9 Marked EasyVision application window in the background

If you have activated one of these functions by accident, then proceed as follows.

Placing the application window in the foreground

1   Mark the symbol of the EasyVision application window on the background and press the 'Open' key (English keyboard).

Placing other windows in the background
By activating the 'Front' key, other windows can be superimposed onto the EasyVision application window.

1   Mark the superimposed window and press the 'Front' key (English keyboard).
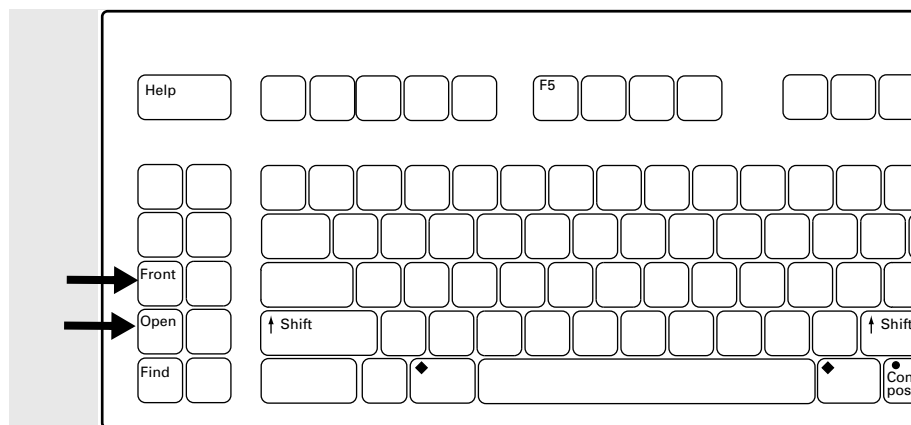
4.6   Checking system calibration

This section describes how to calibrate the system by printing out a test image and then measuring its optical density. You should perform this test about once a week, depending on image throughput.

N O T E
- *To check the system calibration you will require a densitometer which you should calibrate before use. While you are checking system calibration the ambient light should correspond to normal operating conditions.*
- *You also require a table of the target density values to be able to compare the measured values. You can obtain this table from Philips Customer Service.*
- *Do not use test images which have already been imported into the internal database as the contrast and brightness settings of these test images may have been altered. Always import new test images into the internal database.*

Checking system calibration

1   Call up the 'Data handling' program area.

2   Click on the service symbol in the top symbol bar.
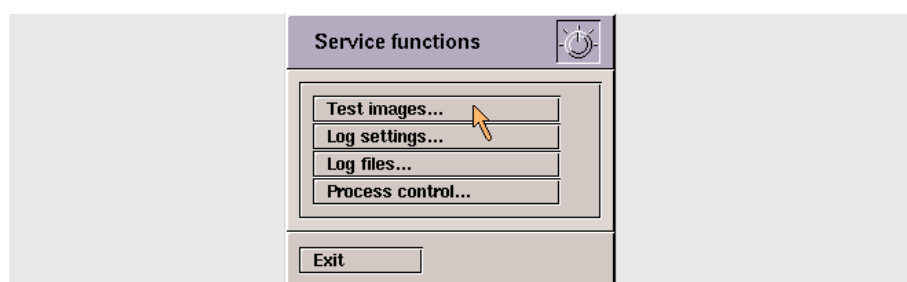- The following window appears.

Fig. 4.10 'Service function' window

3   Click on 'Test images'.
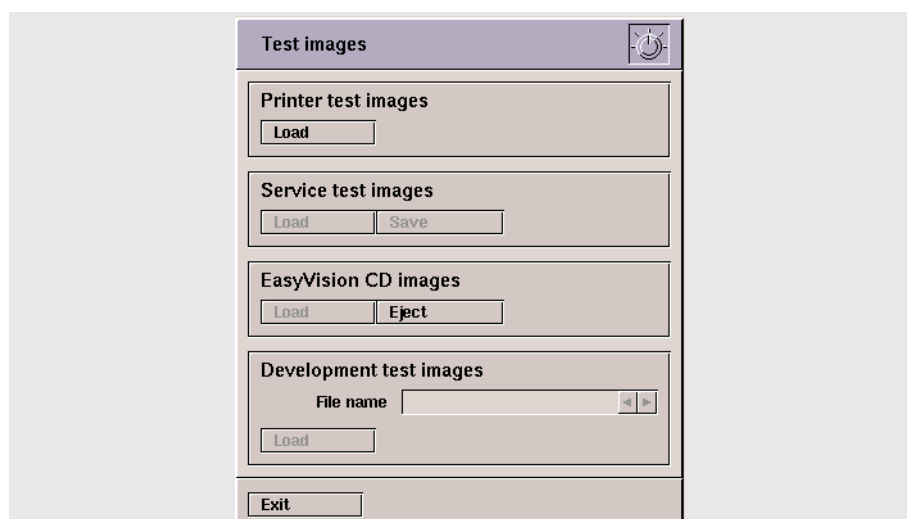- The following window appears.

Fig. 4.11 'Test images' window

4   Click on 'Load' in the 'Printer test images' field.

Various test images are loaded into the internal database. To test the system calibration you only require the **TestImage PrinterCalibration** image, which appears in the index of the internal database after the loading procedure.

5   Switch to a PCR application and from there call up the **TestImage Printer Calibration** image.
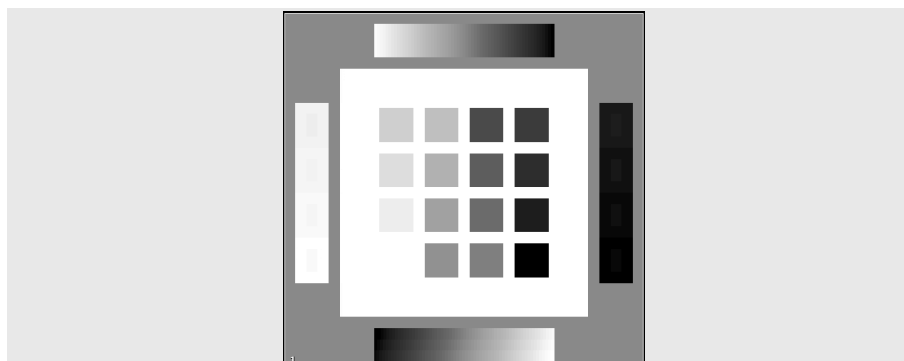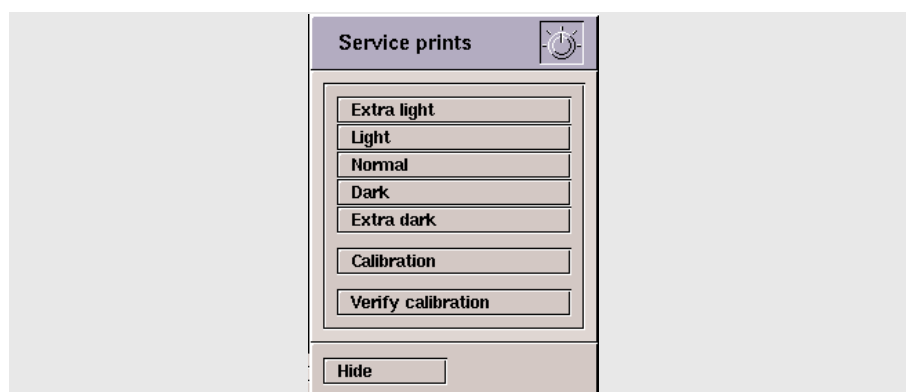

Fig. 4.12 TestImage PrinterCalibration

6   Click on this symbol in the side function bar to call up the print dialog for the print formats.
  - The 'Print using protocols' window appears (see page 8-18).

7   In the 'Print using protocols' window click on the service symbol.
 - The following window appears.

Fig. 4.13 'Service prints' window

8   Click on 'Verify calibration'.

This starts the print job for the printout. The test image is printed out on film four times.

9   After outputting on film, measure the optical density of all the squares with a calibrated densitometer.

NOTE

- *When conducting a full test the density measurement is performed on the four different squares to be able to check density deviations at various points. On account of the laser imager design the density for the same grey value can be different at various points. This means that a total of 4 x 16 = 64 fields must be measured.*
- *For a simplified routine check it is sufficient if the density is measured in one field of a square (always measure the same field). The measured value is compared with the default (Service) and then the deviation is assessed.*
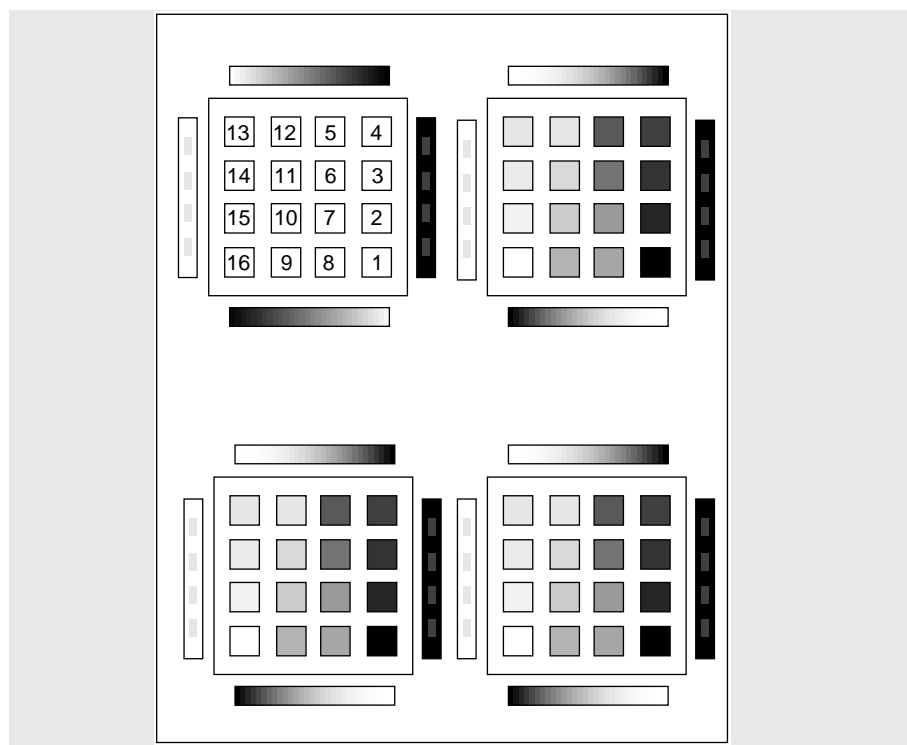
Fig. 4.14 Appearance on film (numbers are not printed)

10 Enter the values measured in the following table and then calculate the average for square number one, number two, etc.

Square	Top left	Top right	Bottom left	Bottom right	Average	Target	Difference
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							

Fig. 4.15 Table for measured and target values

11   Compare the calculated averages with the target densities specified by Philips Customer Service.

12   Calculate the percentage differences between the measured values and the target densities. The following requirements must be met:

• The averages for optical density measured must be between 2.9 and 3.1,
• on all the squares the deviation from target density must be less than 5% plus 0.02 optical density.

NOTE   *If your results do not meet these requirements the system needs calibration. Inform Philips Customer Service.*

13   Delete the test image from the internal database index.

4.7   Screen settings

This section tells you how to use a test image to find the optimum screen contrast and brightness settings. Contrast and brightness settings should be checked every month.

NOTE   *Set the lighting in the room in which you are working so that it mirrors your normal working conditions. A slightly darkened room provides the best conditions for working on the screen. Ensure that there are no lights reflected in the screen.*

Screen settings

1   Load the TestImage PrinterCalibration image again and call it up in a PCR application (see page 4-11).

2   Set the contrast and brightness on the screen to maximum.

3   Now reduce the brightness on the screen and watch the bottom grey rectangle in the right-hand bar on the test image. Reduce brightness so that the bottom grey rectangle is only just visible.
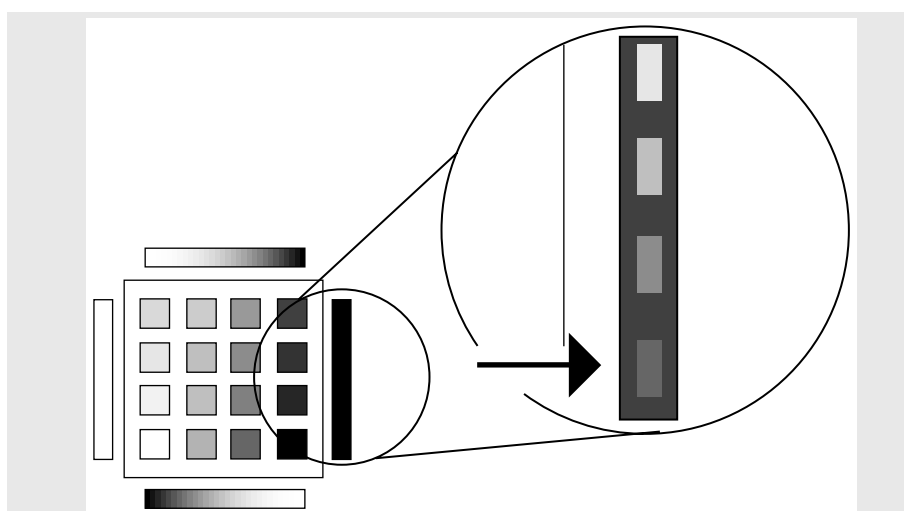
Fig. 4.16 Grey rectangle at the bottom

If the bottom grey rectangle can only just be recognised, the screen is set optimally.

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Chapter 5   Displaying examinations 5-3

5 Displaying examinations

This chapter describes how to select and display examinations. You will learn, among other things, how to use the 'Pictorial select' window and how to work with the virtual screen.
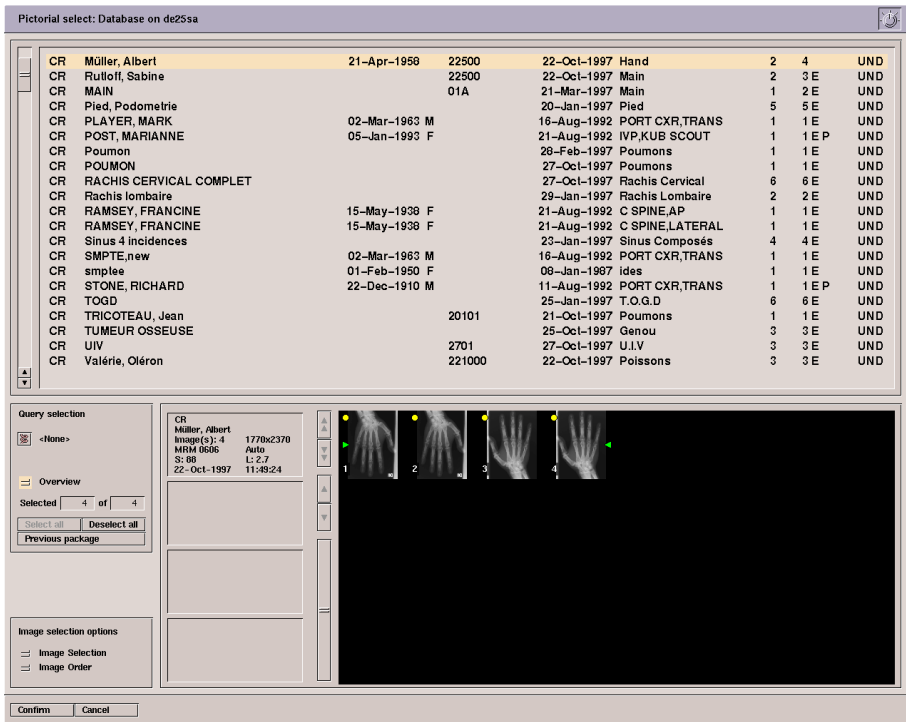

Fig. 5.1 'Pictorial select' window

5.1   Information regarding the image types

Perfect display and error-free processing of images are dependent on the origin of the images, the type of workstation and its outfitting with optional applications.

⚠

DANGER   *Quality and processing errors may occur if images are imported for which the PCR application is not designed. Only system-internal images can be processed properly using the PCR application.*

5.1.1   System-internal images (CR images)

System-internal images means all cassette exposures which have been made with the help of image plate technology and processed within the PCR system. Furthermore, this includes images originating from the 'THORAVI-SION' pulmonary X-ray unit. System-internal images are uniformly labelled in the data directories with the abbreviation 'CR'.

5.1.2   System-external images

System-external images originate from DSI exposure systems or other exposure systems which cannot by coupled with EasyVision RAD. Such images can nevertheless be imported via storage media or other EasyVision workstations and then displayed and processed. However, it is a precondition that the EasyVision RAD workstation be equipped with the appropriate optional applications.

5.1.3   Images from other manufacturers

EasyVision RAD is not suitable for processing images from other manufacturers, e.g. ACR/NEMA images. During import, various errors may occur in the display and processing of image information, text or graphics.
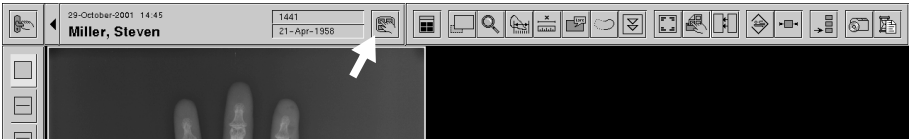
5.2   The 'Pictorial select' window

The 'Pictorial select' window appears automatically if you select the 'PCR' application. If you have chosen an image for display, the 'Pictorial select' window disappears and the 'PCR' application appears. The 'Pictorial select' window can be opened from the PCR application in the following manner.

Opening the 'Pictorial select' window

1   Click on this symbol button in the 'PCR' application.
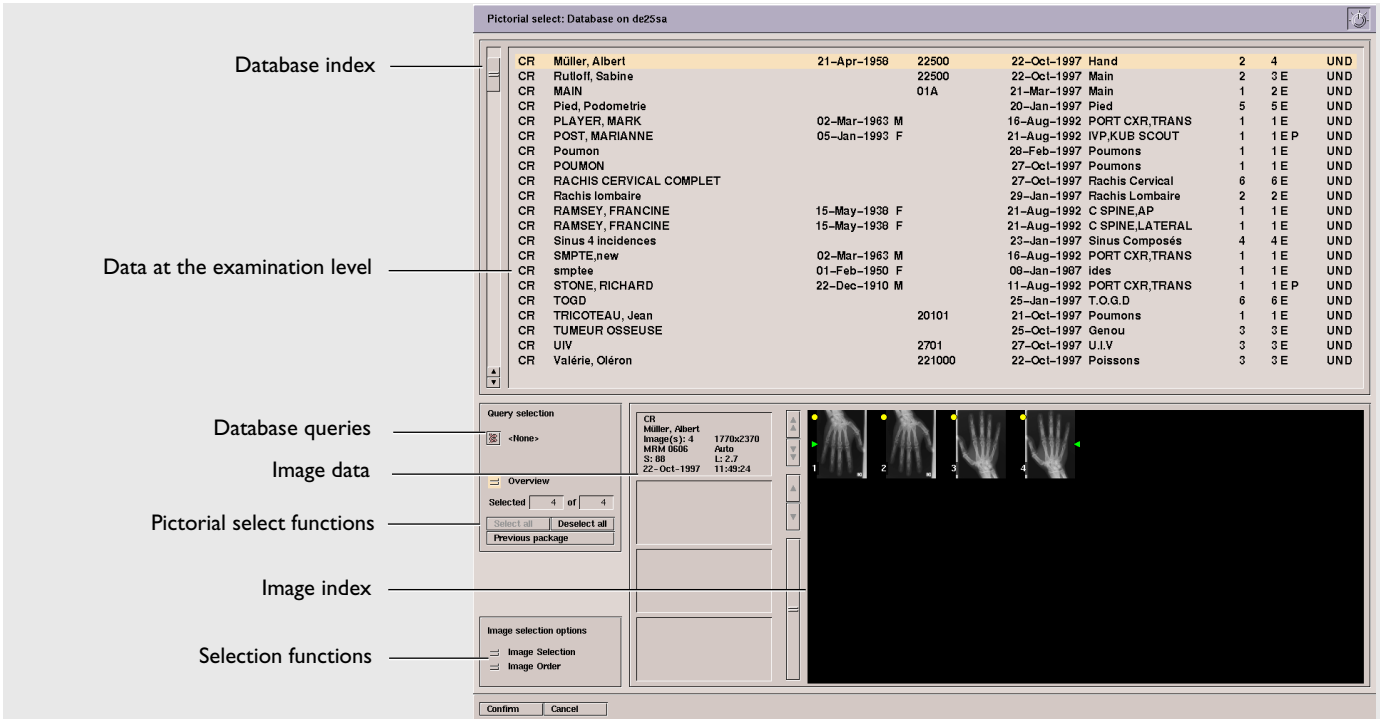
• The following window appears.
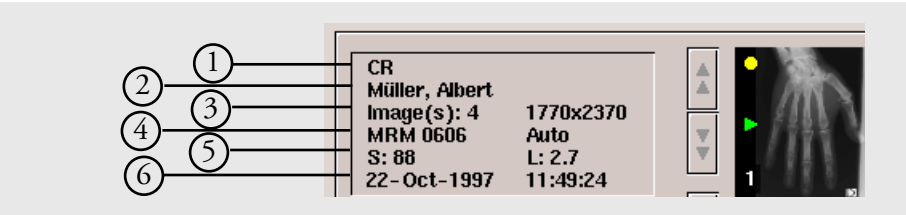

Fig. 5.2 'Pictorial select' window

5.2.1 Information in the data directory

Patient and examination data, as well as various abbreviations regarding the status of the examination are found in the data directory. The following display is an example.

1	2	3	4	5	6	7	8	9	10	11
CR	Smith, Bob	15-Jan-1956	M	12654499	02-Aug-1998	D. Lind	1	2	P	UND

Explanations

1 Modality (CR = Computed Radiography, Digital Radiography,
  XA = Angiography, XR = R/F images, MR = Magnetic Resonance Tomography, CT = Computed Tomography, OT = other images such as test images)
2 Patient name
3 Patient's date of birth
4 Sex: W = female, M = male
5 Patient number (ID)
6 Examination date
7 Performing physician/examination name
8 Number of series included
9 Number of images
10 Abbreviations for the processing statuses of examinations (see page 9-29):
  P = Protected or
  E = Expired; the term of protection has expired
  P = Printed
  S = Stored on CD or MO
  A = Archived; automatically archived
11 Abbreviations for the DICOM statuses of examinations:
  UND = Undictated
  DIC = Dictated
  TRN = Transcribed
  APP = Approved

Image data displayed

Abb. 5.3 Image data in the 'Pictorial select' window

No.	Remarks
1	Modality (CR = Computed Radiography)
2	Patient name
3	Number of images contained and size of pixel matrix
4	MRM code, operating mode of image reader (auto, semi fix)
5	S and L values (S = sensitivity, L = latitude)
6	Date and time of examination

# 5.3   Selecting examinations

The data directory in the 'Pictorial select' window shows the examinations available in the **local database**. The data displayed are structured according to examinations while a patient-oriented structure is used in the 'Data handling' application. In 'Pictorial select', all examinations are listed on one data level, and the images contained therein are displayed in the image index after selection (see Fig. 5.2).

5.3.1   Querying local databases

You can restrict or expand the display of the local database by entering various query criteria, in order to display individual examinations. This process is known as a query. A query contains an order criterion or a combination of various order criteria and can be saved for repeated application. You can select a stored query or start a new query. If a standard query has been stored, this is indicated when calling up the 'Pictorial select' window.

Selecting queries

1   Select a stored query (not shown) from the list selection or select 'User definition' to start a new query.
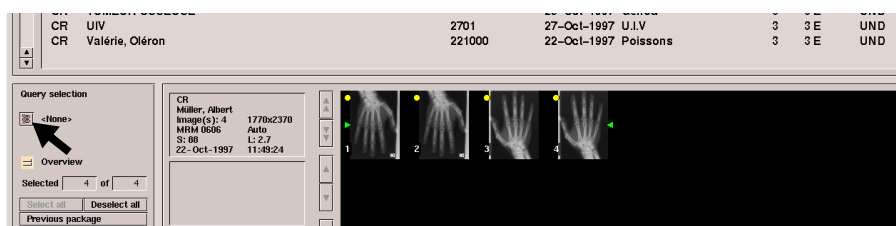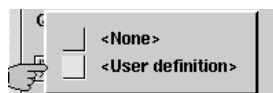
If 'None' is selected, the normal display of the local database appears (the following 'Query' window does not appear).

If 'User definition' has been selected, the 'Query' window appears.

Fig. 5.4 'Query' window

You can find further information regarding the functions of this window in the section „Querying the local database" on page 9-10.

2 Select the required query criteria and click this button.

The data directory shows the result of the query. You can now select the required examinations from the data directory.
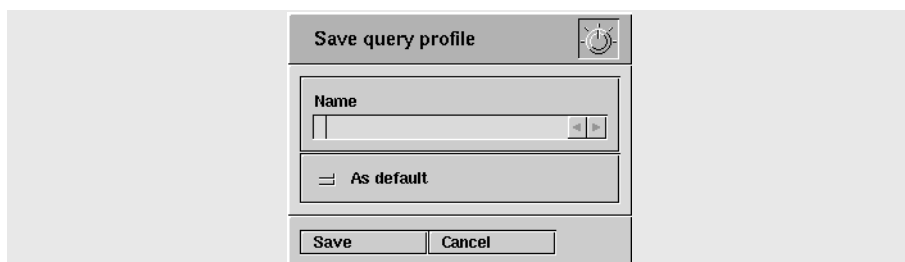
Storing queries

You can store queries whose parameters you would like to use later. A query can also be defined as a **default query**, which then always appears when the 'Pictorial select' window is called up.

Storing queries

Save...

1 Select the required query criteria in the 'Query' window and click on this button in the lower function bar.
  • The following window appears.

Fig. 5.5 'Save query profile' window

2 Give this a name and, if necessary, activate the 'As default' option. .

3 Click on 'Save'.

The new query appears in the list selection (see page 5-7).

5.3.2   Displaying a complete examination

You can display **one** examination or **several** complete examinations. If you
select a new examination, the examination previously called up is then
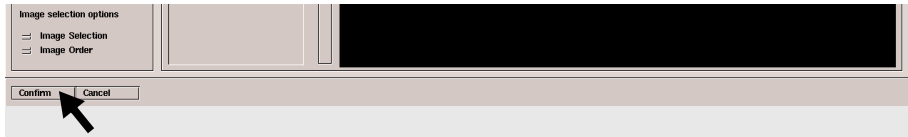closed/removed.

Displaying one examination

1   Double-click with the left mouse button on an examination in the data
directory.

Displaying several examinations

1   Mark the required examinations (see page 4-7).

Confirm   **2**   Click this button to display the examinations.

The images of the examination selected are placed in the display area one
after the other if the single-line display layout has been selected. You can
change the display layout (see page 5-13), remove individual images or place
them in the background (see page 5-22).

Using the optional Navigator, the first image from the examination is dis-
played in the display area, the other images are placed on the virtual display
area.
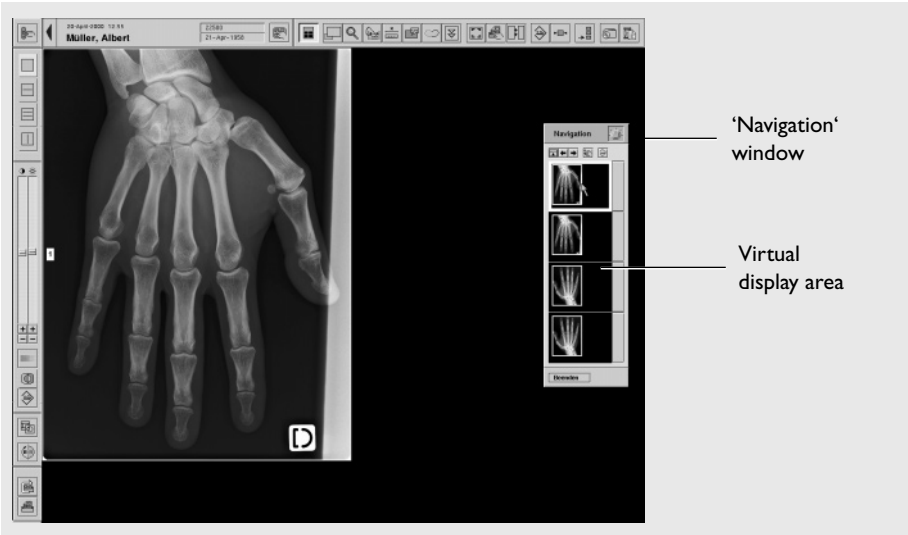
Fig. 5.6 Automatic placement of images

With the help of the 'Navigation' window, you can control the display of
images. For further information on this topic refer to the section „Screen
navigation" on page 5-16.

5.3.3 **Displaying individual images**

You can limit the display to selected images from an examination. For selection, use the images which are depicted in the image index after marking an examination.
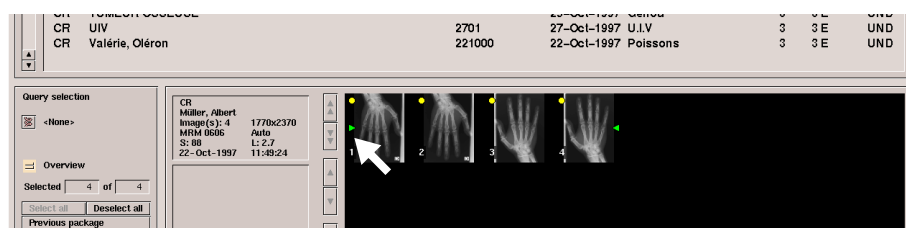
Displaying individual images

1 Mark one or several examinations in the data directory (see page 4-7).

Pictorial select: Database on de25zh										
CR	HART, SUZIE		10–Jun–1991 F			27–Nov–1991 CHEST PED.< 3YR	1	1 E	UND
OT	TestImage SMPTE_1K (SP)		21–Feb–1994		Test 300	21–Feb–1994	1	3 E	UND
OT	TestImage GreyCircles				Frequency Circle 21–Jul–1999		1	1 E	UND
CR	TestImage CR		12–Nov–1997		Test CR	12–Nov–1997	1	1 E	UND

- The images included in all the marked examinations are displayed in the image index.

CR	TUMEUR OSSEUSE				25–Oct–1997 Genou	3	3 E	UND
CR	UIV		2701		27–Oct–1997 U.I.V	3	3 E	UND
CR	Valérie, Oléron		221000		22–Oct–1997 Poissons	3	3 E	UND

Query selection

⬡ <None>

🗀 Overview

Selected 4 of 4

Select all   Deselect all
Previous package

CR
Müller, Albert
Image(s): 4   1770x2370
MRM 0606   Auto
S: 88   L: 2.7
22–Oct–1997 11:49:24

Fig. 5.7 Image index

If you double-click on the first image of an examination, **all** the images of the examination are displayed.

| Select all | Deselect all |

2 Mark or unmark the required images by mouse click, or use these buttons to do this.

| Confirm |

3 Click this button to display the images.

Image selection options
⬒ Image Selection
⬒ Image Order

Confirm   Cancel

The images selected are placed in the display area one after the other if the single-line display layout has been selected. You can change the display layout (see page 5-13), remove individual images or place them in the background (see page 5-22).

With the optional Navigator the first image of the examination is shown in the display area whilst the other images are placed in the virtual display area. With the help of the 'Navigation' window, you can control the display of images. For further information on this topic refer to the section „Screen navigation" on page 5-16.

5.3.4   **Using the select function**

Selecting images in the display area is necessary for using various functions. For printing purposes the **order** in which the images displayed have been selected is also relevant because they are integrated into the film layout in that order. The select function allows automatic selection of images and display of a selection number.

Using the select function

1   If necessary, before selecting images in the Pictorial Select window, click on the corresponding option buttons.

Image selection	If this option is activated, all the images in the display area are automatically selected when calling up.
Image order	If this option is activated, a selection number appears on the image in the display area. It indicates the current position of the image in the sequence.

The figure below shows the activated function 'Image order'; the first out of a total of four marked images is displayed.
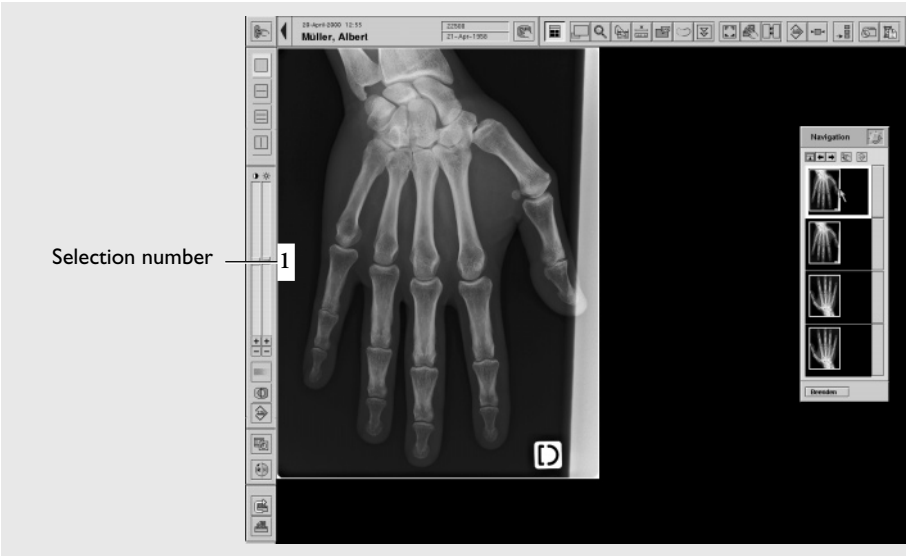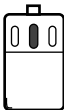

Selection number —— 1

Fig. 5.8 Activated function 'Selection order'

Changing the order of selection

1   With the left mouse button click on the image which you want to be placed first.

2   With the centre mouse button click on the other images in the order you want them.

5.3.5   # Changing display layout

The display area of the PCR application can be split up in order to optimise the presentation of images. The images are displayed at the largest scale if the display area is not split up. If you call up more than one image in this mode, they will be displayed on top of one another (not with the optional Navigator). To avoid overlapping, the display area can be split up line by line.

Changing display layout

1   After calling up the images, click on the corresponding button in the side function bar.

|	
	Display area not split (1-image mode)
	Display area split into two horizontal segments
	Display area split into three horizontal segments
	Display area split into two vertical segments

Fig. 5.9 Example: two-line display layout

5.3.6   **Enlarge display area**

You can enlarge the display area for images by hiding the top function bar. When the function bar is no longer shown there is a matrix of 1220 x 1024 pixels available on the display area.

Enlarge display area

1   In the function bar click on the arrow next to the door symbol.
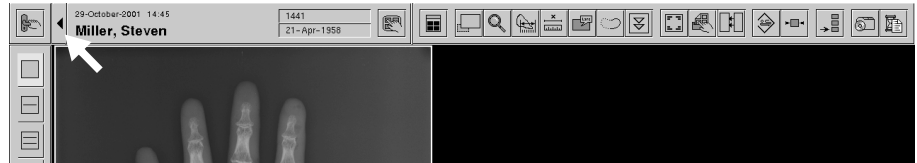
- The top tool bar disappears.

2   Click on the arrow again to restore the tool bar.

5.3.7   **Displaying new images from the image reader**

In the PCR application you can directly display the images being received from image readers. When you open the 'New' window, the last image transferred from the image reader selected is first displayed in the top field. If the window remains open, the following images will also be displayed. They pass through the window in the chronological order of their transfer from top downwards. If a different image reader is selected or if you close the window, the last image transferred will be displayed again.

Displaying new images

1   Click this symbol button.
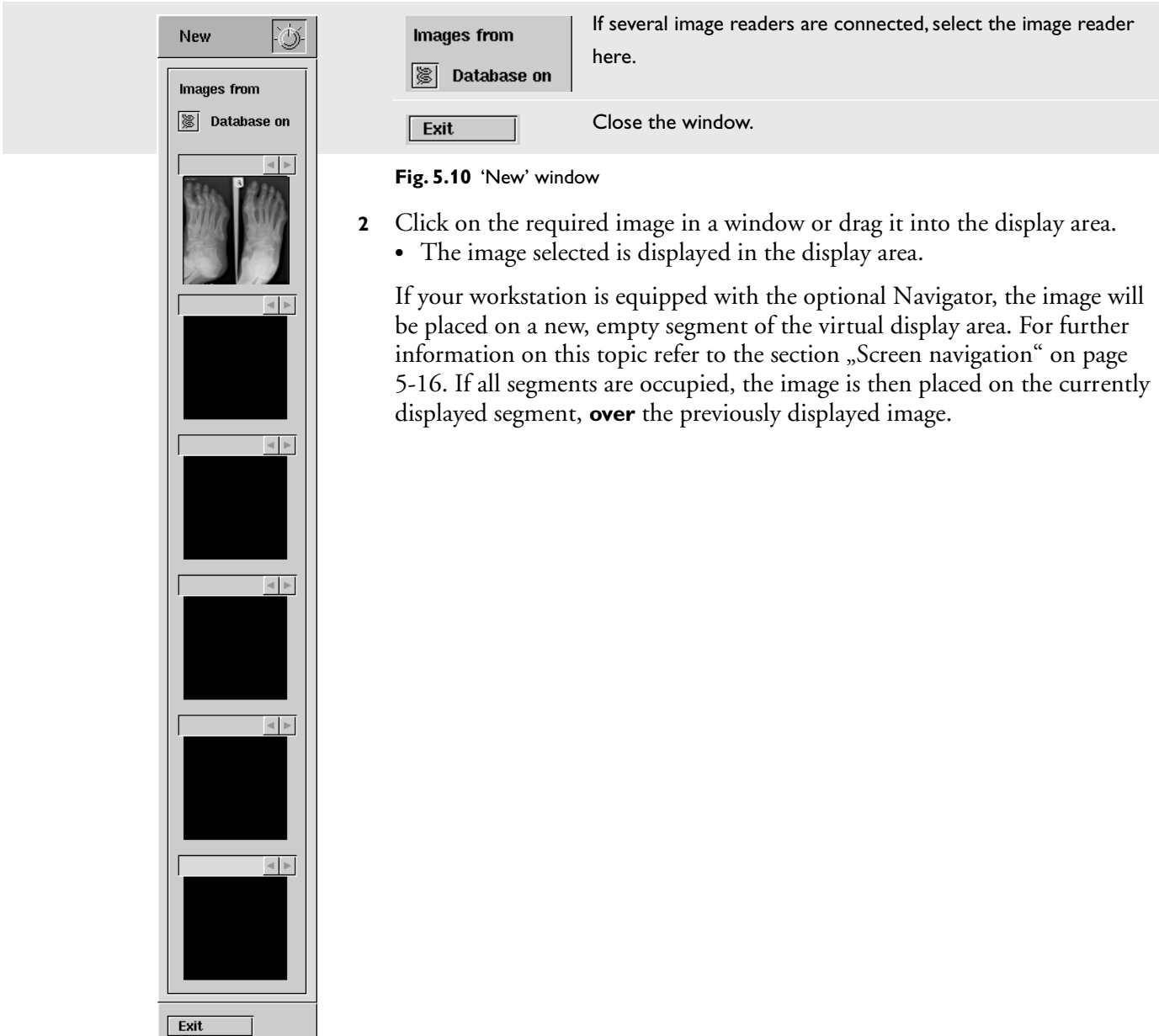
• The following window appears.

Images from 盈 **Database on**	If several image readers are connected, select the image reader here.
Exit	Close the window.

Fig. 5.10 'New' window

2   Click on the required image in a window or drag it into the display area.
• The image selected is displayed in the display area.

If your workstation is equipped with the optional Navigator, the image will be placed on a new, empty segment of the virtual display area. For further information on this topic refer to the section „Screen navigation" on page 5-16. If all segments are occupied, the image is then placed on the currently displayed segment, **over** the previously displayed image.

5.4   Screen navigation `Option`

The optional 'Navigation' function window is used to control the virtual display area. The virtual display area is an extension of the display area visible on the screen. It simplifies simultaneous working with several examinations and the distribution of function windows and images over several screens.
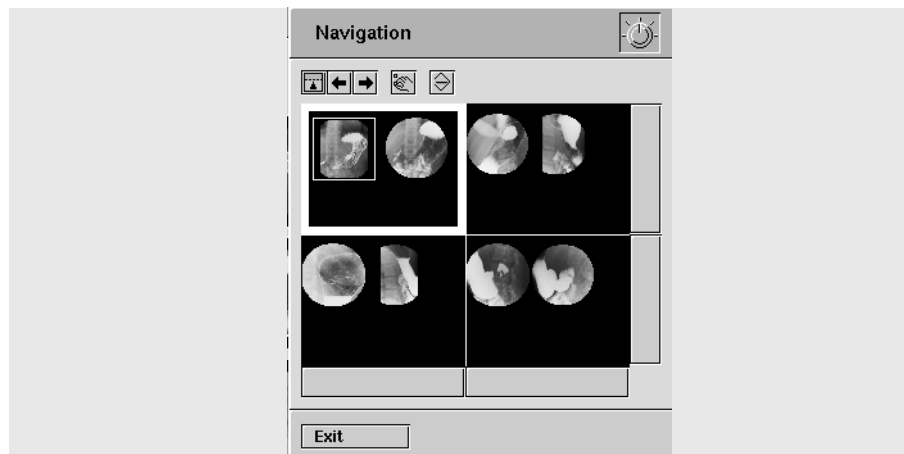
Fig. 5.11 'Navigation' window

5.4.1   How the virtual display area functions

If you call up examinations with several images, the Navigator automatically generates a virtual display area. The first image is displayed on the screen, the following images are positioned in segments on the virtual display area. The number and order of the automatically generated segments is dependent on user-defined settings. For further information on this topic refer to the section „Setting the Navigator" on page 5-21.
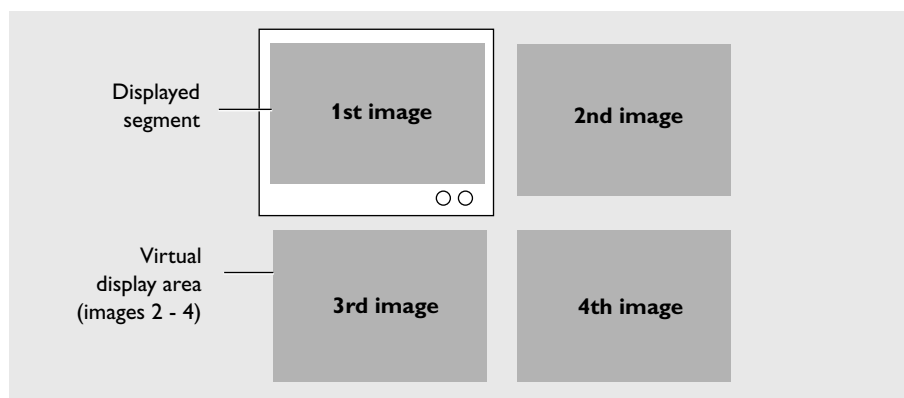
Fig. 5.12 Automatic positioning of images

In the 'Navigation' window, you may do the following, among other things:
- display various segments,
- position images on various segments or
- generate new segments for the storage of images.

### 5.4.2   Calling up the 'Navigation' window

The 'Navigation' window initially shows where the called-up images have been positioned and which segment of the virtual display area is currently displayed. When calling up new examinations, the first segment is always displayed (top left). A white frame identifies the displayed segment. The positioned images or the displayed segment (white frame) can then be moved.

Calling up the 'Navigation' window

1   Click this symbol button.

• The following window appears.
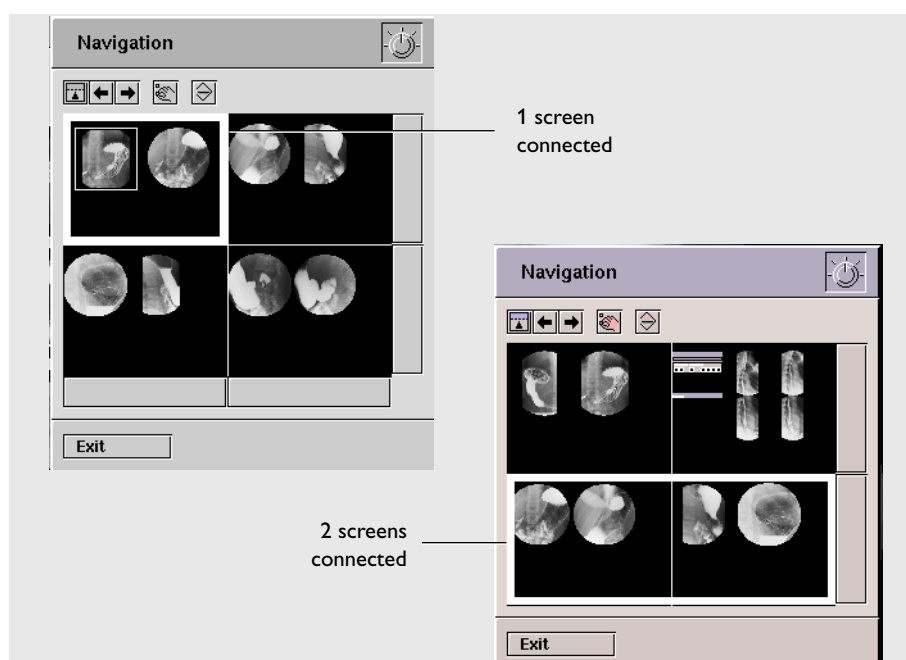
Fig. 5.13 Identification of displayed segments

The following sections describe the navigation possibilities.

5.4.3   Displaying segments

To display any segment, you can use various techniques.

Moving frames

The white frame represents the display on the screen.

1   Move the white screen with the left mouse button depressed to the required position.
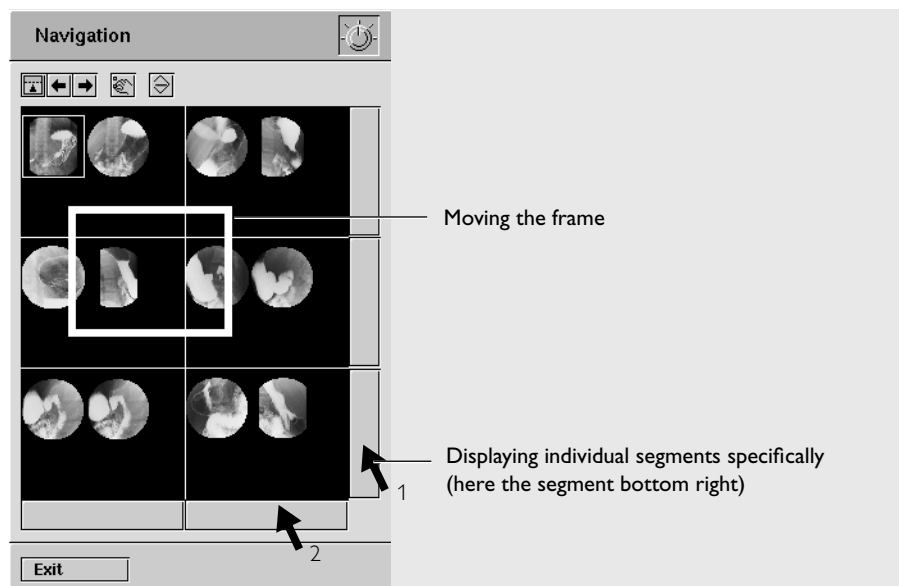
Fig. 5.14 Displaying segments

Button control

1   Click the vertically and horizontally arranged buttons on the window margin to display specific individual segments.
    – or –

2   use the cursor keys to display the segments consecutively.
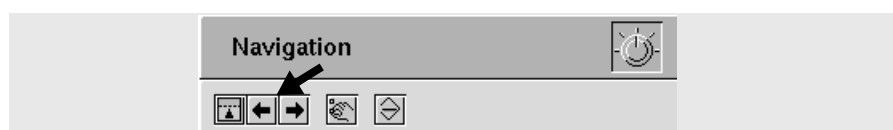
5.4.4 Moving images

You can move images on the virtual display area to all segments. With this process you can produce new segments.

NOTE *No images from the 'Navigation' window can be moved to the display area of the screen or vice versa (no 'drag and drop').*

Moving images

1 Drag the images to the required position with the left mouse button depressed.
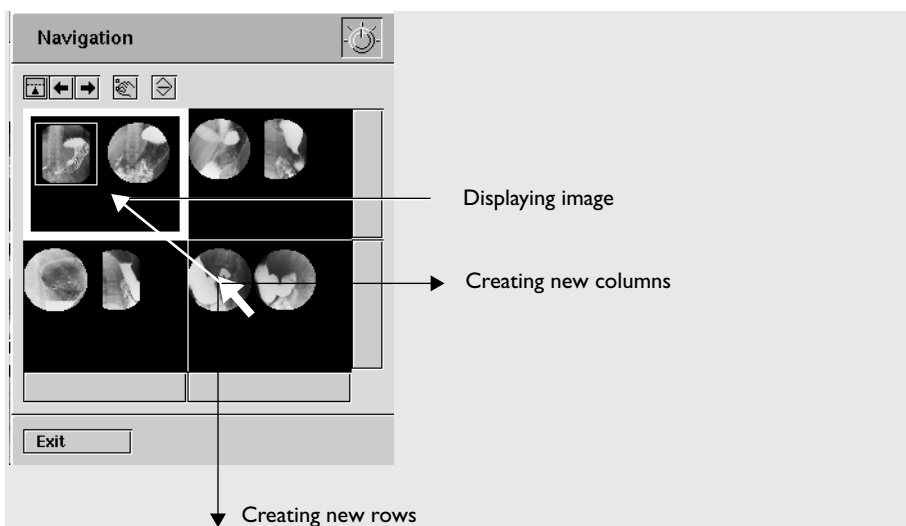

Fig. 5.15 Moving images

2 If you would like to create new rows or columns in the Navigator, drag the image beyond the window margin. New rows/columns are created up to a maximum number defined by the user (see page 5-21).

5.4.5 Sorting images

After moving the images, you can sort them back into the original order present when calling up the examination. The method of sorting can be adjusted in the 'Navigation options' window (see page 5-21).

Sorting images

1 Click this symbol button.
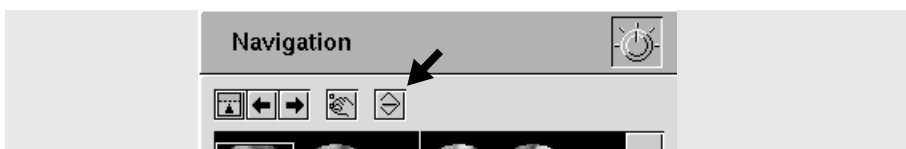
• The moved images are sorted into the original order.

Depending on the number of images and the memory capacity (RAM) of your workstation, this process can take some time.

5.4.6   **Switching over the Navigator size**

When called up, the Navigator always appears in full size. You can then select the reduced size in which no images are displayed.
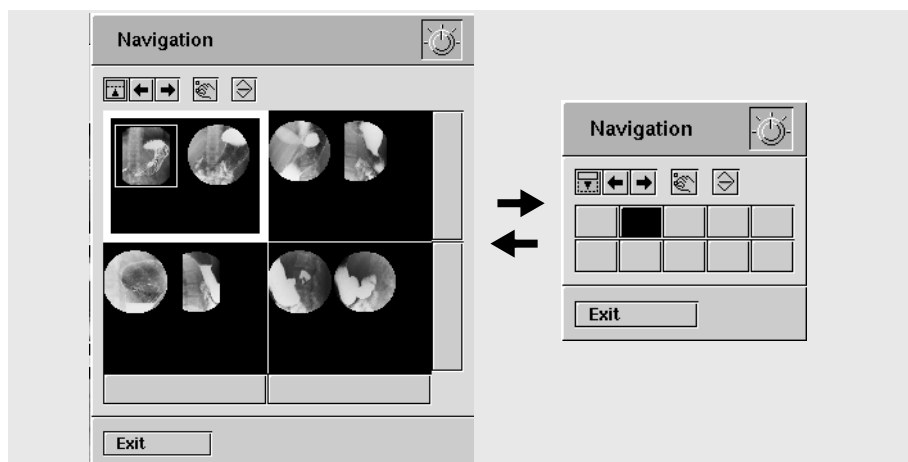
Fig. 5.16 Full size and reduced size

Switching over the size

1 Click on this symbol button.

• The following window appears.

Fig. 5.17 Reduced size

2 Click again on the symbol to return to full size.
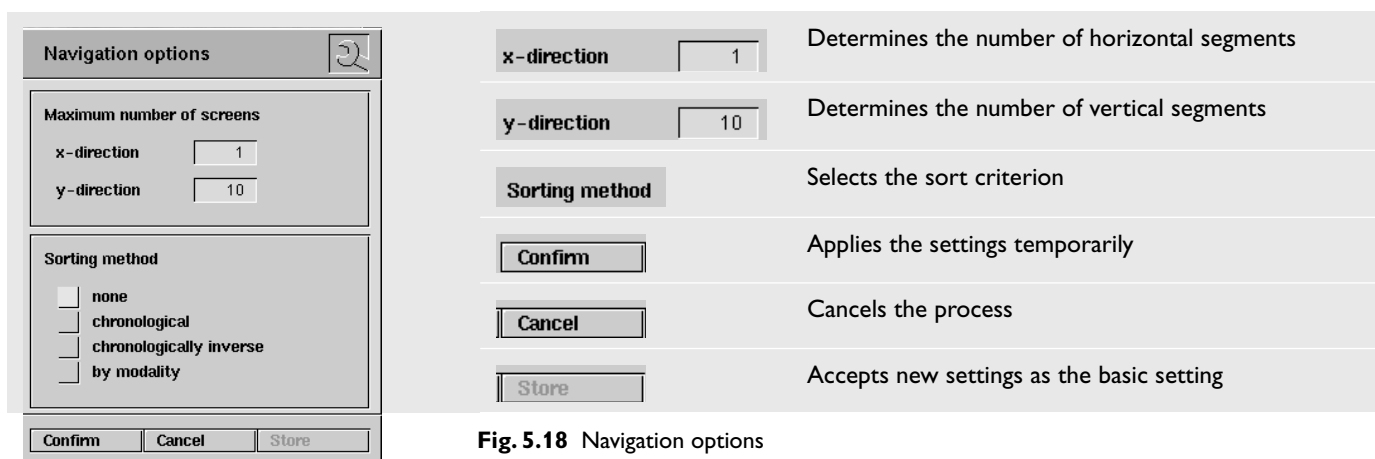
5.4.7   Setting the Navigator

You can set basic parameters regarding the function of the Navigator, e.g. determining the maximum number of segments in the x and y direction. The new settings can be stored as a basic setting or for temporary application.

Setting the Navigator

1   Click this symbol button.

- The following window appears.

x-direction 1	Determines the number of horizontal segments
y-direction 10	Determines the number of vertical segments
Sorting method	Selects the sort criterion
Confirm	Applies the settings temporarily
Cancel	Cancels the process
Store	Accepts new settings as the basic setting

Fig. 5.18 Navigation options

2   Select the required settings and confirm or save your choice.

The images currently called up are re-sorted.

N O T E   *You can accelerate the sorting by upgrading the memory (RAM) of your workstation.*

5.5   Working with images

5.5.1   Removing/protecting images

You can remove specific individual images of an examination from the display area without removing (deleting) these from the local database. Individual images can also be protected against automatic erasure in this way. For further information on this topic refer to the section „Automatic deletion" on page 9-28.

Removing/protecting images
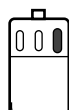
1   Mark the image(s) on the display area.

2   With the **right** mouse button, click on a marked image.
 • The following window appears.
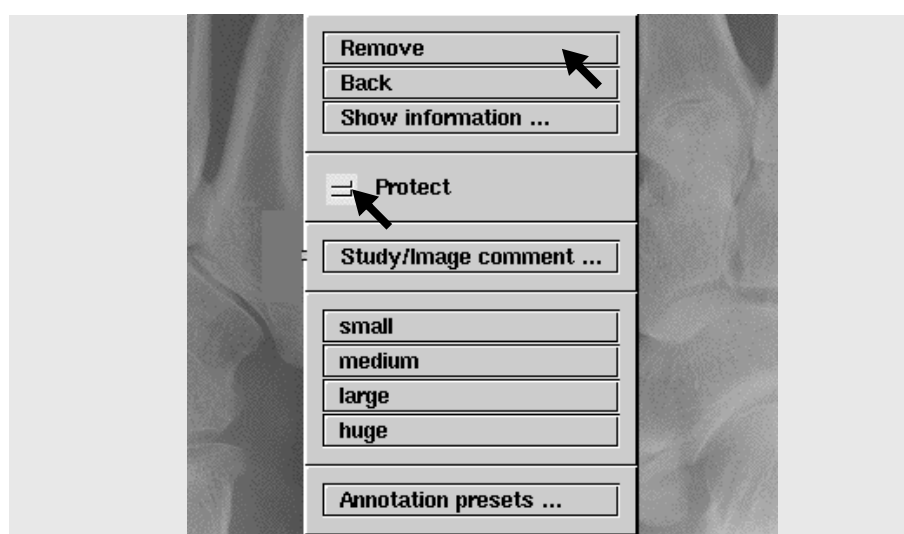
Fig. 5.19 Context menu

3   In the context menu, select 'Remove' or 'Protect'.
  • The marked images are removed from the display area or protected.

5.5.2 Moving images to the front/back

Images may be superimposed in the display area. You can change the position of images lying on top of one another with a mouse click or with the help of the context menu.

Using the mouse

1 With the **left** mouse button, click on a superimposed image in the background.
   • It is brought to the foreground and marked for processing at the same time.
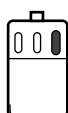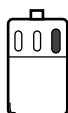
Using the context menu

1 With the **right** mouse button, click on the image that you would like to move to the back.
   • The context menu appears (see Fig. 5.19).

2 Select 'Back'.
   • The image is placed in the background.

5.5.3 Displaying/editing comments

You can enter comments in the PCR application which are stored at the study or image level. Comments on the image level can already be entered at the PCR terminal ('Image Options' window) and edited at the EasyVision RAD workstation; they appear on the film. Comments at the study level are stored for the examination but not output on the film.

Editing comments

1 With the **right** mouse button, click on the image on the display area (see Fig. 5.19).
   • The context menu appears.

2 Select 'Study/Image comment'.
   • The following window appears.
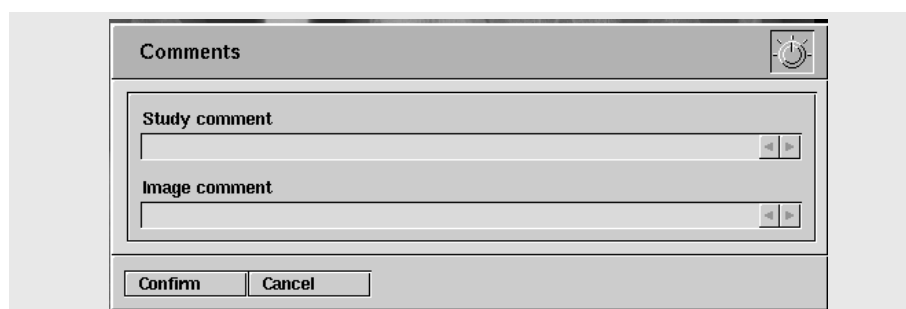
Fig. 5.20 'Comments' window

3 Enter the required comments at the study or image level.

5.5.4   **Changing the image size**

You can change the size of images on the display area in order, for example, to position several images within the displayed segment. A change in size on the display area has no effect on the picture size when the image is output.

Changing the image size

1   Move the mouse to a corner of the image and click the left mouse button.
    • The mouse pointer changes its shape.

2   Drag the image with the left mouse button to the required size.

Enlarge/reduce the image
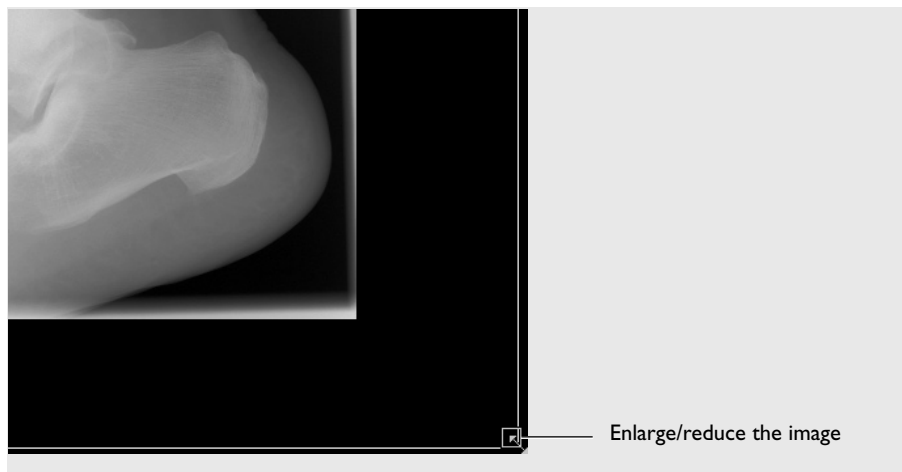
Fig. 5.21 Changing the size

5.6   Displaying image data

5.6.1   Edit the data display

In the display area various patient and examination data can be displayed or removed. This display has no influence on image output. The position of the display can also be adjusted.
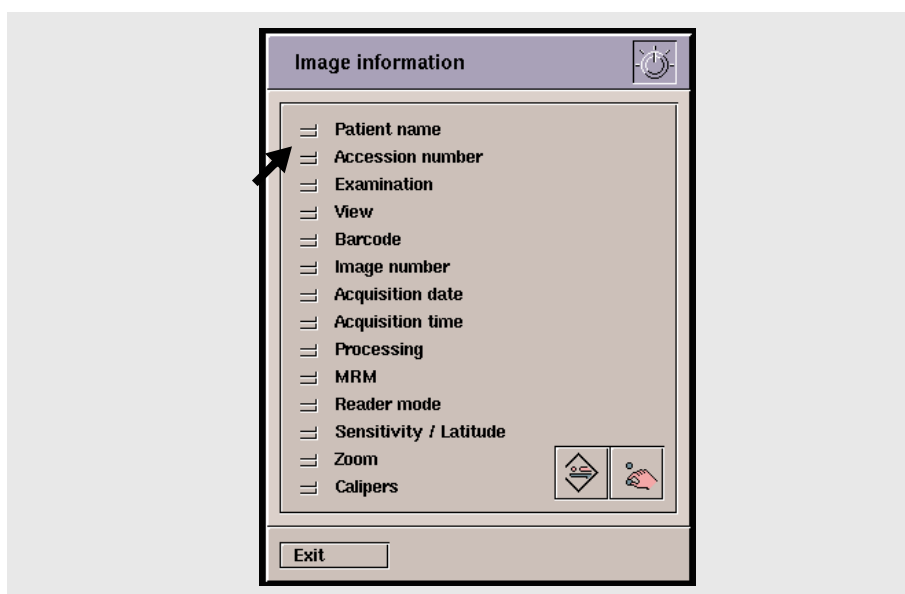
Editing the data display

1   Click this symbol button.

•   The following window appears.

Fig. 5.22 'Image information' window

2   Select the required data for display (see table below).

The data are displayed accordingly on the display area. This is a permanent setting which is preserved when the equipment is switched on and off.

Data	Remarks
Patient name	The patient name is displayed.
Accession number	The accession number within the study is displayed
Examination	The name of the exam is displayed.
View	The name of the view is displayed.
Barcode	The barcode of the image plate is displayed.
Image number	The image number is displayed. 'Image 0' indicates all the images which have been transferred from the image reader more than once.
Acquisition date	The date of image acquisition is displayed
Acquisition time	The time of image acquisition is displayed
Processing	The parameters of the processing technique used are displayed (UM, DRR)
MRM	The menu code of the image reader is displayed.
Reader mode	The mode of image plate readout is displayed.
S value / L value	The S and L values from the image reader are displayed (brightness/contrast).
Zoom	If applicable, the zoom factor is displayed which has been set with the zoom functions.
Calipers	Scales are shown at the edge of the image

Determining the position

1   In the 'Image information' window, click this symbol button.
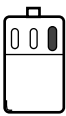   • The following window appears.
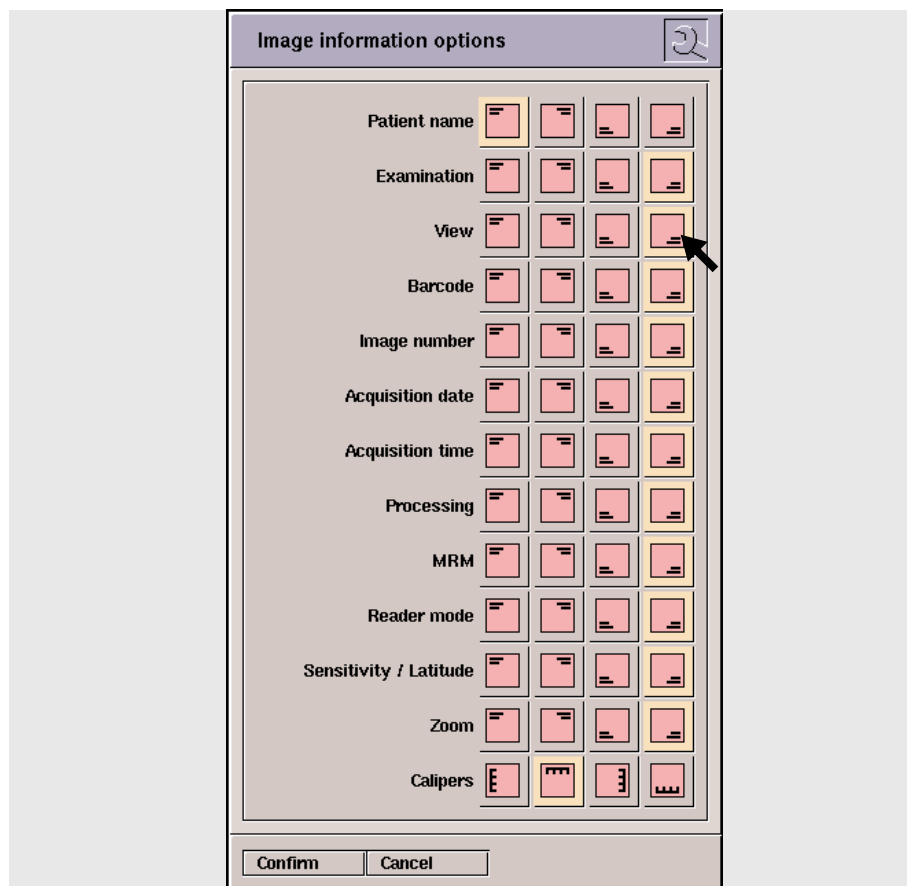
Fig. 5.23 'Image information options' window

2   Select the position of displayed data and then click on 'Confirm'.

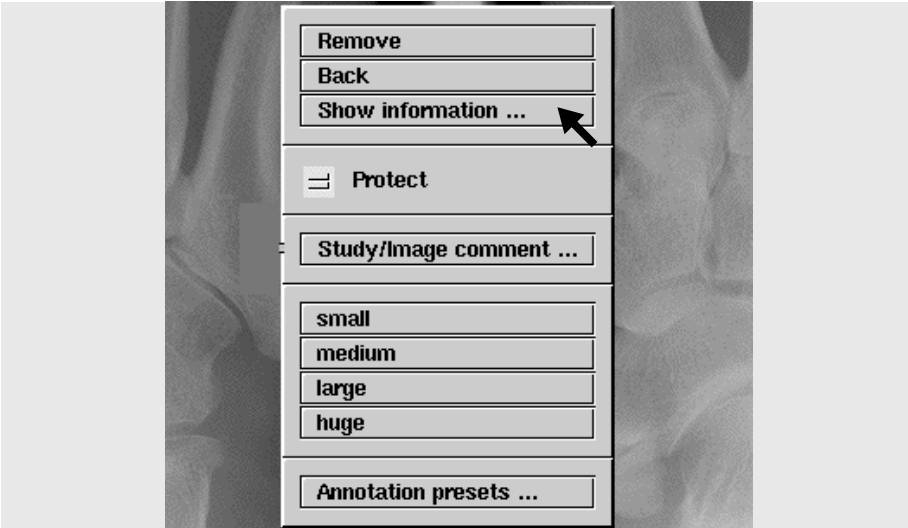The data are then displayed accordingly on the display area.

5.6.2   Display additional image data

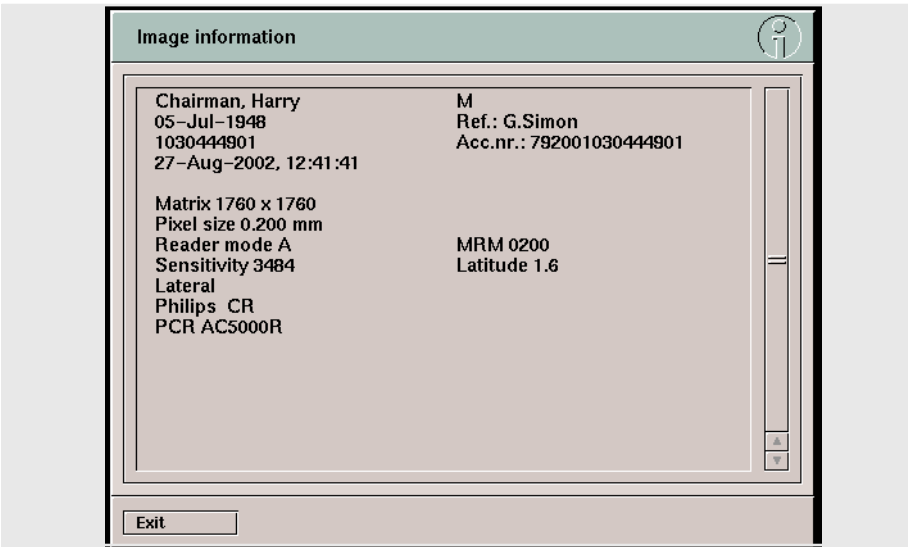You can display further data regarding the image and the patient.

Display image data

1   With the **right** mouse button, click on the image on the display area.
    • The following window appears.

Fig. 5.24 Context menu

2   Select 'Show information'.
    • The following window appears.

Fig. 5.25 'Image information' window

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5.6.3 # Quality displays

Various displays may appear on an image which identify changes or quality limitations. To prevent confusion with other text information, these are displayed at the upper right image margin in pointed brackets (< >).

Display position

Fig. 5.26 Position of change and quality displays

Symbol	Explanation
<cal>	Identifies calibrated images. The scale of the image has been changed here.
<C>	Image with information loss (C = compression) Information loss after compression (factor > 2) or incomplete decompression on another imaging system.
<S>	Overview image (survey) In optional applications, this identifies overview images with a limited diagnostic quality, e.g. reconstructed survey of the spine, suitable only for the diagnosis of scoliosis.
<!>	Image with quality faults Only manual printing possible
<I>	Image with altered information (I = inconsistency) e.g. grey level reduced from 12 bit to 8 bit or patient data changed
<F>	Fluoroscopy image (F = fluoroscopy) Image with low resolution (grainy appearance)
<S, !>	Example of a combination of various displays

Chapter 6

Postprocessing image quality 6-3

Working with the UNIQUE technique   6-38

6 Postprocessing image quality

In the PCR application programme, only system-internal images can be processed properly (see page 5-4).

This chapter describes how you can optimise image quality subsequently. You will become acquainted with, among other things, the various techniques for image processing (DRR, UM and UNIQUE algorithms) and learn how to define new processing protocols for special application purposes.
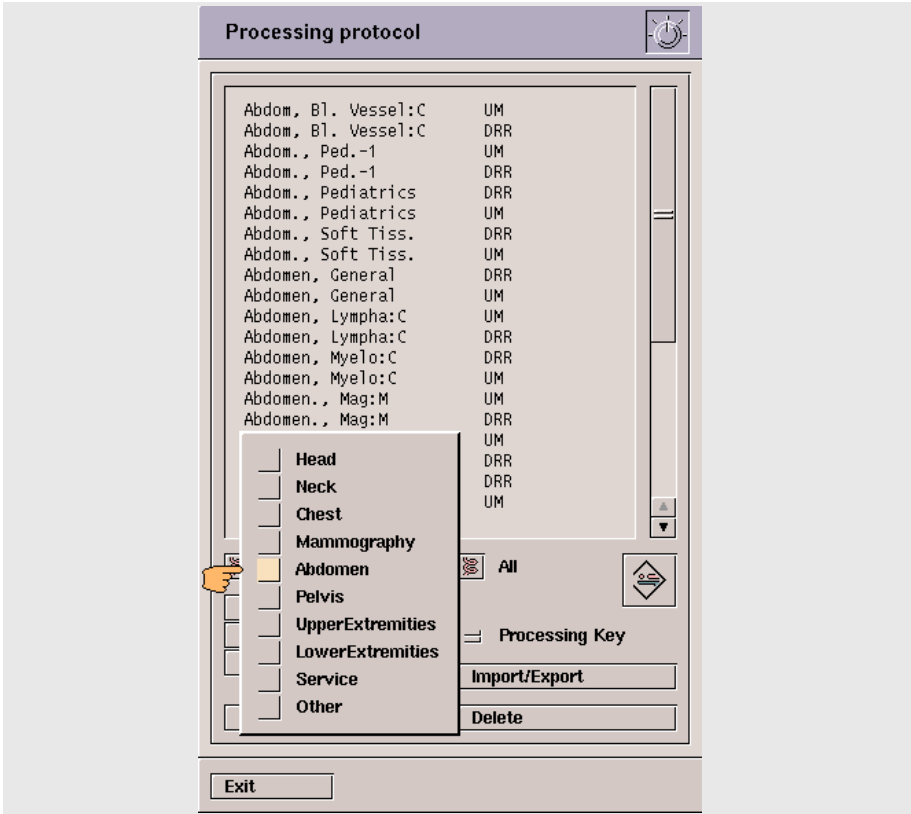
Fig. 6.1 Window for selection of processing protocols

D A N G E R *Incorrect use of the image processing functions may produce image artefacts. Diagnostically relevant image information may then be suppressed or falsely displayed. You must have substantial knowledge of digital processing to change the default parameters within a processing protocol.*

6.1   # Adjusting brightness and contrast

You can correct brightness and contrast in a simple manner by using the slider or '+/-' buttons on the left margin of the window.

Changing the contrast/brightness

1   Mark the image(s) on the display area (see page 4-7).

N O T E   *If several images are marked on the display area which have been processed using different techniques, the adjustment of contrast and brightness is blocked.*

2   Adjust the contrast and brightness with the help of the slider or the (+/-) buttons.

Fig. 6.2 Brightness and contrast settings

When you move the slider for contrast, the slider for brightness also moves in certain cases. This effect always occurs whenever the grey scale range displayed has reached the upper or lower limit and is enlarged even further on account of contrast reduction (see page 5-19).

Resetting changes

1   Click this symbol button on the side function bar.

All the changes are reset to the original values (original values of the processing protocol).

6.2   **Working with processing protocols**

Processing protocols are parameter sets for the preparation of raw image data to produce analysable images. Each body region is assigned specific processing protocols which ensure optimum image representation of the region concerned. On the EasyVision RAD computer, the processing techniques 'UM' (Unsharp Masking technique) as well as the option of 'DRR' (Dynamic Range Reconstruction) or UNIQUE are available. Moreover, there are special processing protocols for images from the pulmonary X-ray station 'THORAVISION' and for servicing purposes.
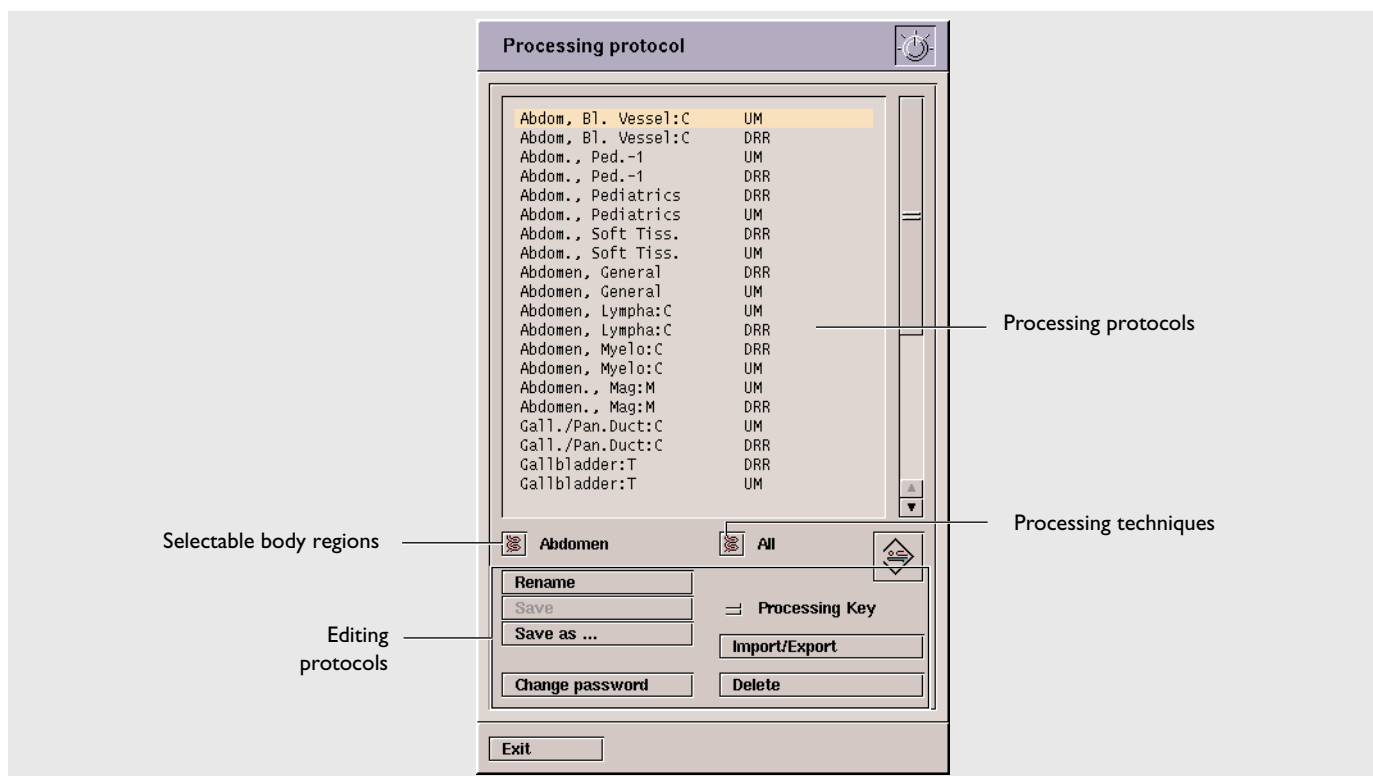
Fig. 6.3   Processing protocols

The 'Rename', 'Save', 'Save as' and 'Delete' editing functions always relate to a single processing protocol which has been previously marked. The 'Import/ Export' function, on the other hand, involves the entire set of processing protocols from all the regions of the body, including the 'Service' and 'Other' areas. Previous marking is unnecessary here. The 'Processing Key' and the list selection for regions of the body and for processing techniques are for display purposes only.

You can use various functions to display processing protocols. The processing protocols are sorted by region of the body. The various processing techniques and the Processing Key can be displayed or removed.

Displaying processing protocols

1   Mark the image(s) in the display area (see page 4-9).

2   Click on this symbol key.
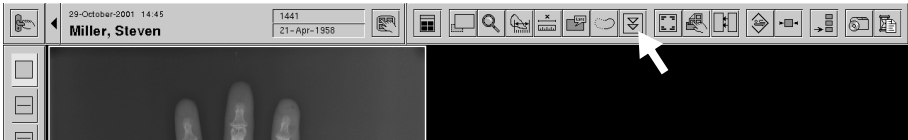
• The following window appears.

Abdomen	*Selection list for regions of the body* Head, neck, chest, mammography, abdomen, pelvis, upper extremities, lower extremities, other, service (for Philips Customer Service only)
All	*Display of processing technique* All, DRR, UM, UNIQUE
Processing Key	Display/remove Processing Key in the region of the body selected

Fig. 6.4 'Processing protocol' window

The corresponding region of the body is displayed; the processing protocol of the image marked is highlighted.

3   Use the functions to display further information.

6.2.2   ## Assigning processing protocols

When the PCR system is installed, it is determined which technique and processing protocol is to be used to process the examinations performed. You can change the processing technique subsequently or assign user-defined processing protocols for special exposures.

The 'Default' processing protocol ('Other' selection list) is automatically selected if the protocol requested by the PCR terminal is not available on the EasyVision workstation. This situation can arise if a processing protocol has been deleted manually. The 'No enhancement' processing protocol is used for images which have already been processed or for R/F images.

Assigning processing protocols

On the display area, the images are shown which you would like to process. You can assign marked images new processing protocols.

1   Mark the image to be reprocessed in the display area.

2   Call up the 'Processing protocols' window and by clicking the mouse select a new processing protocol (see page 5-7).

The corresponding set of parameters is applied to the image marked. To reset to the original processing protocol, click this symbol key.

6.2.3   ## Working with password protection

The editing functions ('Rename', 'Delete', etc.) can be protected against unauthorised use by adding a password query. If password protection is used, the password query is displayed once after a function has been activated.

Fig. 6.5 Password protection

When the correct password has been entered all the other functions can be executed without any password query until the function window is closed again. If at a later point in time it is opened again, the password query appears again if you click on a button.

Incorrect entries made a number of times do not have any special effect. Password protection is activated for the first time by entering a password.

Activating password protection

1   In the 'Processing protocols' window click on 'Change Password'.
    • The following window appears.
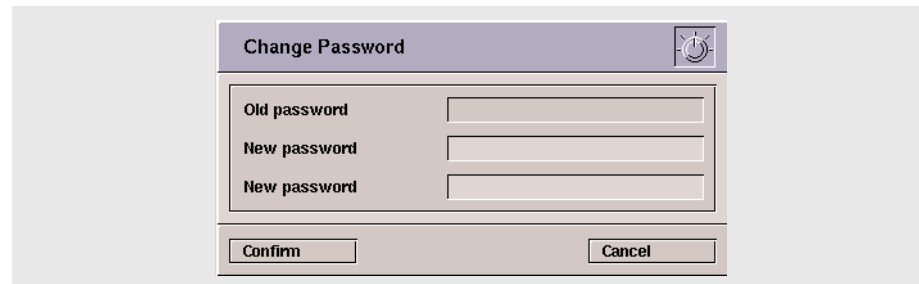
Fig. 6.6 'Change Password' window

2   Enter the new password twice and then click on 'Confirm'.

Password protection is activated and a query will appear when you next click on one of the functions.

Changing the password

You can replace the old password with a new one.

1   In the 'Processing protocols' window click on 'Change Password'.
    • The following window appears.
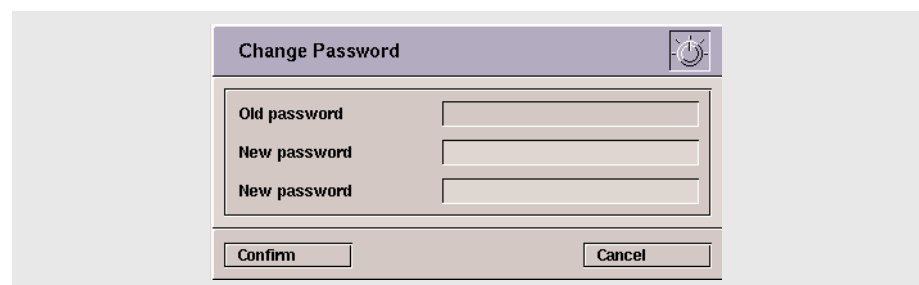
Fig. 6.7 'Change Password' window

2   Enter the old password and then enter the new password twice, then click on 'Confirm'.

The new password is valid and there will be a query when you next click on any of the functions.

Deactivating password protection

You can deactivate password protection again.

1   In the 'Change Password' window enter the old password.

2   Do not make any entries in the 'New password' fields and click 'Confirm'.

Password protection is deactivated.

6.2.4   **Changing processing protocols**

You can change the parameters of individual processing protocols. If you select processing protocols which are used for automatic image processing, the next images will be processed using the changed parameter set.

⚠

DANGER   *Incorrect use of the image processing functions may produce image artefacts. Diagnostically relevant image information may then be suppressed or falsely displayed. You must have substantial knowledge of digital processing to change the default parameters within a processing protocol.*

Changing processing protocols

1   Call up the image which has been processed with the protocol to be changed and mark it in the display area.

2   Open the function window for the processing protocols by clicking this symbol button.

• The following window appears.
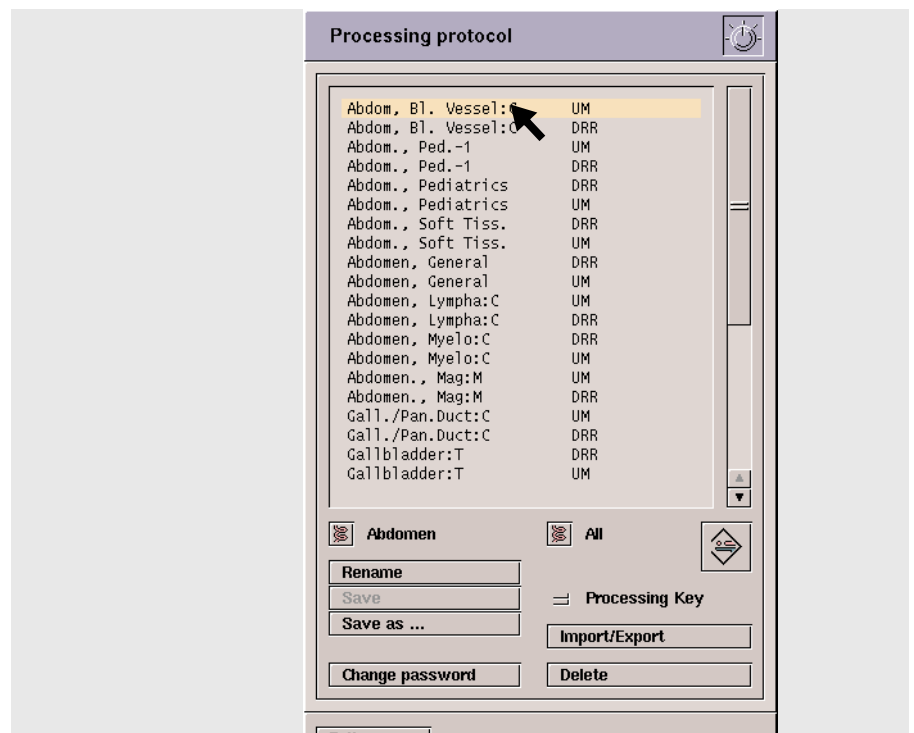
Fig. 6.8 Selecting a processing protocol

The corresponding processing protocol is highlighted. If you wish, you can select a different protocol.

3 Change the settings according to your requirements with the aid of the grey scale and image processing functions.
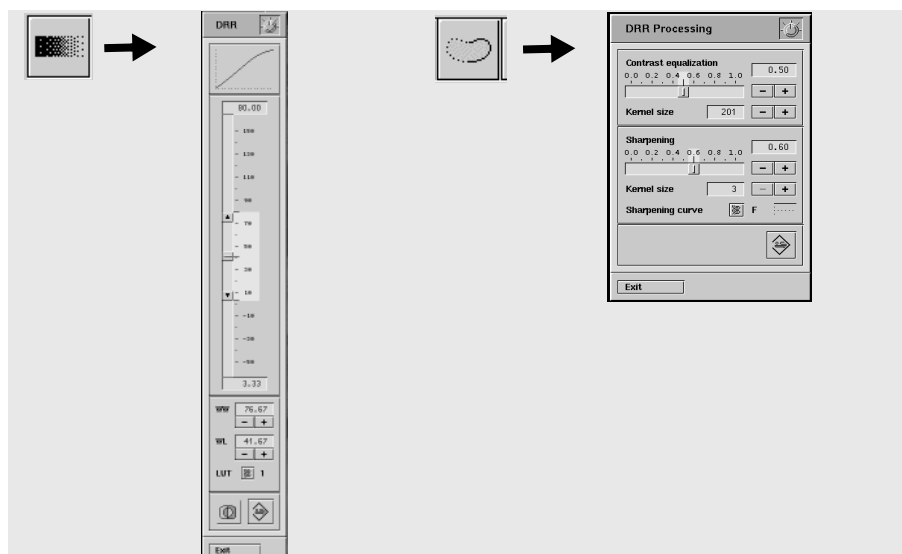
Fig. 6.9 Processing functions from the toolbars

The changed processing protocol appears with a hatched background in the 'Processing protocol' window.

4 In the 'Processing protocol' window click on 'Save'.
   • The following window appears if the processing protocol is used for automatic image processing.
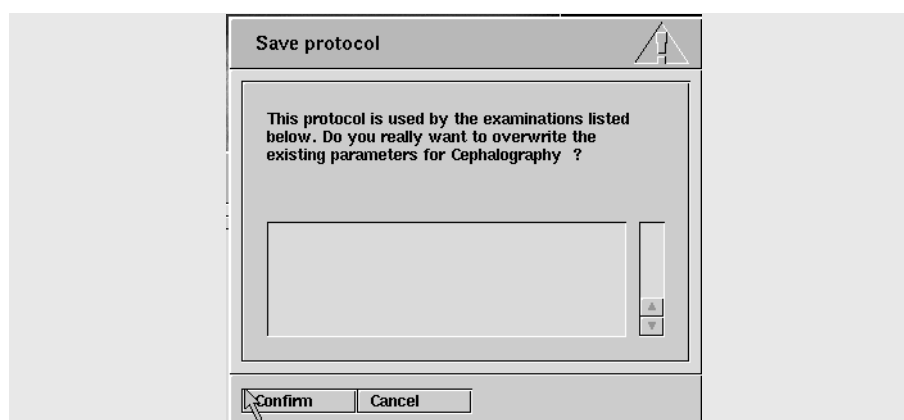
Fig. 6.10 'Save protocol' window

Some processing protocols are used to display different examinations. In this window all the examinations are executed which are assigned to the processing protocol selected.

5 Click on 'Confirm'.

The changes are saved in the PCR system. The next images to be received will be processed with the changed sets of parameters.

6.2.5 Defining new processing protocols

You can define new processing protocols and apply these **manually** for special diagnostic problems. You can create user-defined processing protocols on the basis of an existing processing protocol.

N O T E
If you wish to use the new processing protocols for automatic image processing then you have to change the database accordingly in the "Advanced User Menu" of the PCR terminal (see the Instructions for Use module of the PCR terminal).

Defining new processing protocols

1 As described in the previous section, call up an image which has been processed with the protocol which is to be used as a basis for the new one.

2 Change the parameters to suit your requirements and in the 'Processing protocol' window click on 'Save as'.
   • The following window appears.
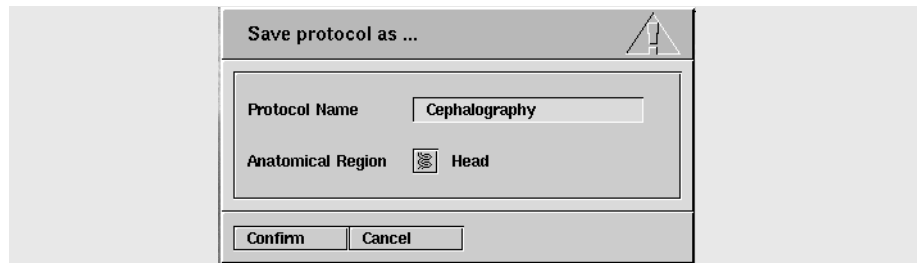
Fig. 6.11 Window for entering the name

3 If you wish, select the category required in the selection list (e.g. 'Other').

4 Overwrite the name of the processing protocol and click on 'Confirm'.

The new processing protocol appears in the list and can be assigned manually to an image.

6.2.6   # Renaming the processing protocols

You can change the name of individual processing protocols. This applies to both user-defined and default processing protocols, used for automatic image processing. No communication problems occur because the Processing Key does not change if the name changes.

Renaming the processing protocols

1   Call up an image and select the processing protocol which is to be renamed.

2   In the 'Processing protocol' window click on 'Rename'.
  • The following window appears.
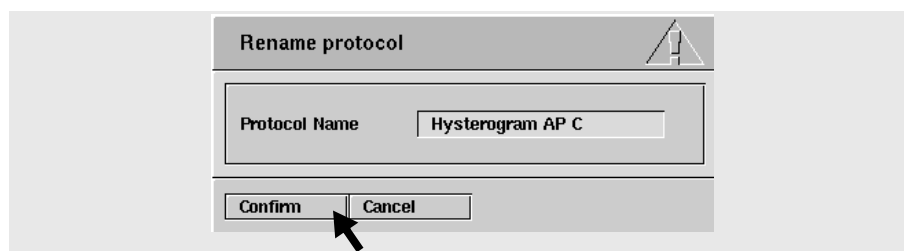
Abb. 6.12 Window 'Rename protocol'

The current name of the selected processing protocol is given.

3   Enter a new name and click on 'Confirm'.

The processing protocol now appears in the list with the new name. If you select a name that is already in use, the following message will appear.

Abb. 6.13 Warning

Choose a different name in this case.

6.2.7   # Deleting processing protocols

You can delete individual processing protocols from the list.

⚠

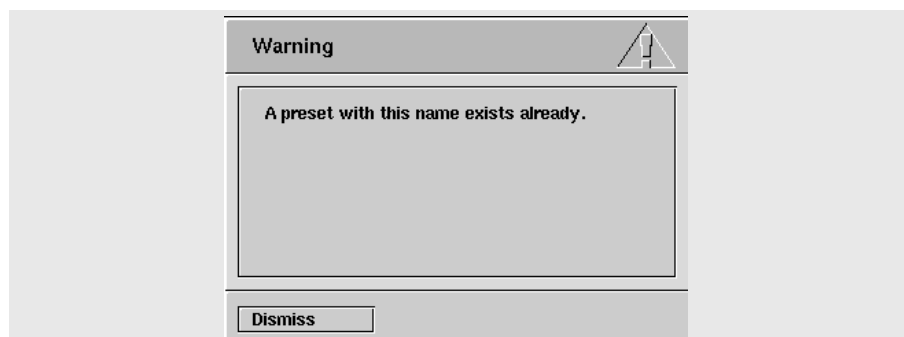**DANGER**   *Do not delete any processing protocols used for automatic image processing. This leads to communication and function problems in the PCR system. Only delete additionally produced, user-defined processing protocols.*

Deleting processing protocols

1   Select the processing protocol to be deleted and in the 'Processing protocol' window click on 'Delete' (see Fig. 5.8).
   • The following window appears.
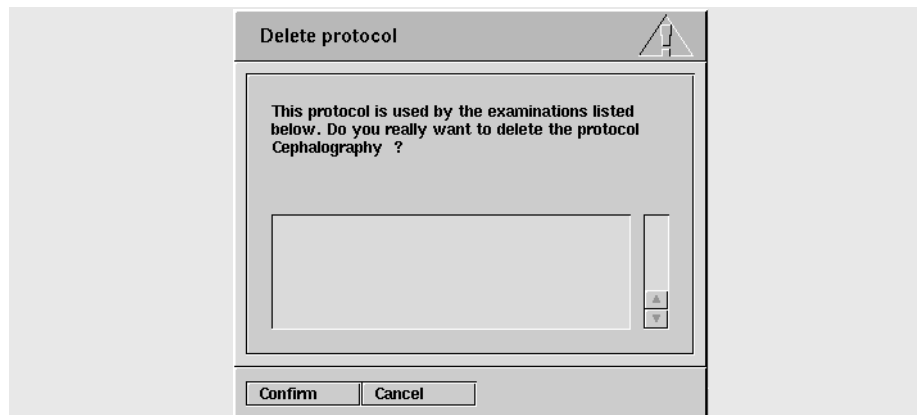
Fig. 6.14 'Delete protocol' window

Some processing protocols are used to display different examinations. In this window all the examinations are executed which are assigned to the processing protocol selected.

2   Click on 'Confirm'.

The selected processing protocol is deleted.

6.2.8   ## Exporting (saving) processing protocols

You can export the entire set of existing processing protocols in order to save a copy of the current settings. The storage space required for this is approx. 1 MB. The set can be saved either to floppy disk if your EasyVision RAD computer is equipped with a disk drive, or in a directory on the internal hard disk. If you save on a hard disk, you can then save to floppy disk from the PCR terminal (see "Advanced User Menu" in the Instructions for Use of the PCR terminal). The saved set of parameters can be imported again later or loaded at other workstations.

Saving to floppy disk

N O T E   *The floppy disk used must be completely empty, formatted for a DOS operating sys-*
tem and have a storage capacity of 1.44 MB. If you use an unformatted floppy disk or
a format for a different operating system, you will see a message to indicate that the
floppy disk drive cannot be started.

1   In the 'Processing protocol' window click on 'Import/Export' (see Fig. 5.8).
    • The following window appears.
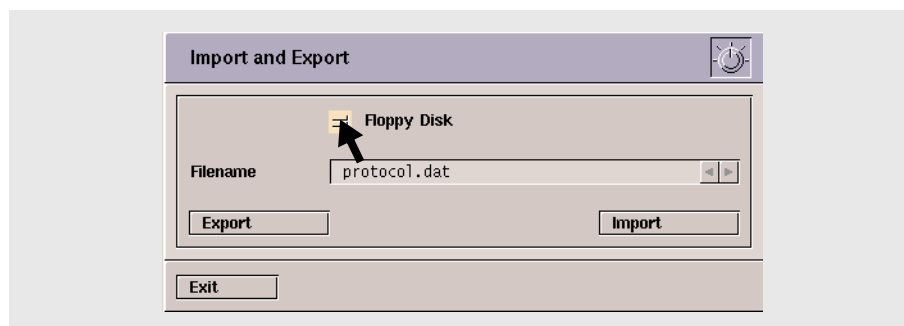
Fig. 6.15 'Import and Export' window

2   Insert an empty DOS-formatted floppy disk (1.44 MB) in the floppy disk drive of the EasyVision RAD computer.

3   Activate the 'Floppy Disk' option.

In the input field you will now see the default file name 'protocol.dat'. Philips recommends using the default file name in order to avoid problems when importing. However, you can enter a different name for the file. Observe the DOS conventions when writing file names. If you use a different file name, you are advised to make a note of it because it cannot be displayed on the EasyVision RAD computer.

4   Click on 'Export'.

The entire set from the EasyVision database is saved on the floppy disk inserted. When the procedure has been completed, an appropriate message appears.

Saving to the internal hard disk

1   Deactivate the 'Floppy Disk' option if necessary.
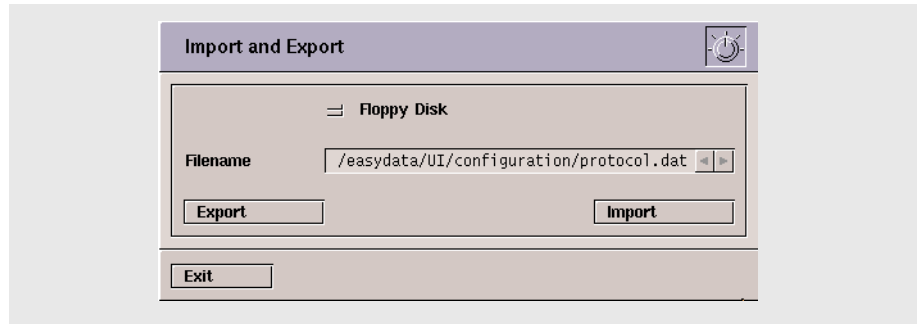
Fig. 6.16 'Import and Export' window

In the input field you will now see the default directory path with the file name 'protocol.dat' at the end. Philips recommends using these defaults for saving in order to avoid problems when importing. However, you can enter a different path and a different name. Observe the DOS conventions when writing file names. If you use a different path or file name, you are advised to make a note of it because it cannot be displayed on the PCR terminal.

N O T E   *If after saving to the internal hard disk you wish to save to floppy disk using the Advanced User Menu, you must not change the default file name 'protocol.dat'.*

2   Click on 'Export'.

The entire set from the EasyVision database is saved in the directory named. When the procedure has been completed, an appropriate message appears. You can transfer the file from the PCR terminal to a floppy disk. For this use the "Advanced User Menu", which is described in the Instructions for Use module of the PCR terminal.

6.2.9   ## Importing (loading) processing protocols

You can import an entire set of saved processing protocols onto the EasyVision RAD computer. It is imported either from floppy disk if your EasyVision RAD computer is equipped with a floppy disk drive, or from the directory on the internal hard disk.

N O T E   *The entire set of saved processing protocols always replaces the old set. When importing, all the existing processing protocols are therefore deleted.*

If the EasyVision RAD computer is not licensed for processing with the optional DRR technique, DRR processing protocols will be ignored when importing.

Loading from floppy disk

Have the floppy disk at hand on which you have saved the entire set of processing protocols.

1   In the 'Processing protocol' window click on 'Import/Export' (see Fig. 5.8).
  • The following window appears
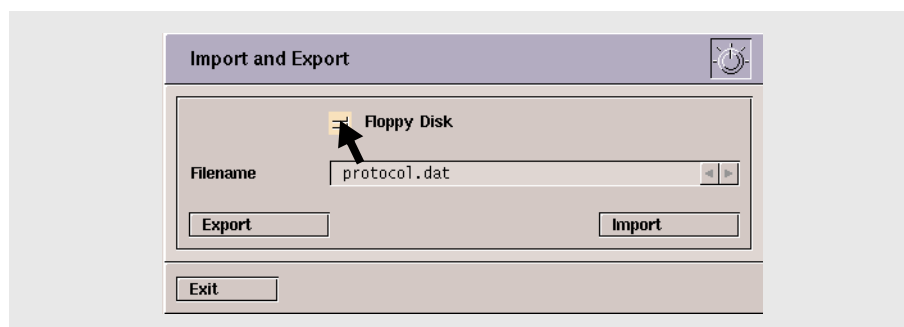
Fig. 6.17

2   Insert the floppy disk in the floppy disk drive of the EasyVision RAD computer.

3   Activate the 'Floppy Disk' option.

In the input field 'protocol.dat' is displayed as the default, irrespective of the actual file name on the floppy disk. In this input field the exact name of the file to be imported must be entered. So if when exporting you have used a different file name, enter that name now. If you have not changed the default name displayed during the export procedure, you do not have to make any entry now.
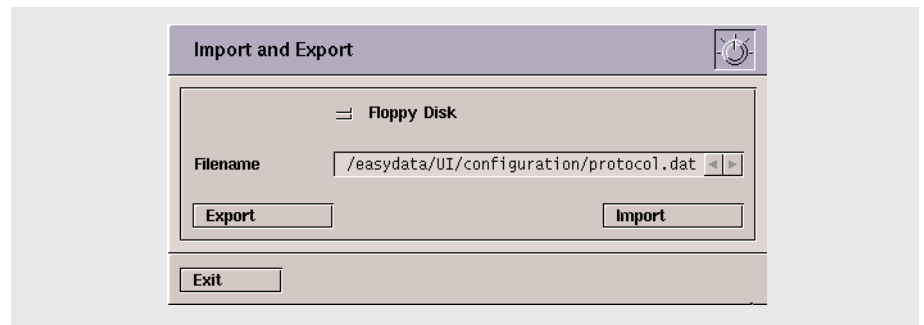
4   Click on 'Import'.

The entire set of parameters is imported from the floppy disk to the EasyVision database. This procedure takes some time; when it has been completed an appropriate message appears.

Loading from the hard disk

You can load the saved processing protocols from the internal hard disk if you have saved them there when exporting them.

1   Deactivate the 'Floppy disk' option if necessary.

Fig. 6.18

In the input field a directory path and the file name 'protocol.dat' are shown as defaults, irrespective of the actual name and place of storage. In this input field the exact path and name of the file to be imported must be entered. So if when exporting you have used a different path or file name, enter that data now. If you have used the default displayed, you do not have to make any entry here.

2   Click on 'Import'.

The entire set of parameters is imported from the directory to the EasyVision database. This procedure takes some time; when it has been completed an appropriate message appears.

6.3   Working with the DRR technique `Option`

Image processing with the DRR technique (Dynamic Range Reconstruction) allows fine structures to be emphasized without changing the overall impression of the image. By equalising the contrast in the range of larger structures, a greater dynamic range results which permits a very contrasted presentation of fine structures. A similar effect is achieved in classic radiography through the compensating screens, meaning image intensification screens with different degrees of sensitivity.

Before setting the dynamic range, the contrast/brightness characteristic is first adapted.

6.3.1   Adapting the contrast/brightness characteristic

Good image reproduction is characterised by an adapted shape of function curve for contrast and brightness within the grey scale of interest. You can select a default function curve and determine its shape. When setting the shape, the grey scale range of interest for the image should be displayed with as many different grey levels on the screen as possible.

For displaying images on the monitor the existing 1,024 grey levels are reduced to 256. To avoid further losses the window level and width should be optimally positioned. Reduction to 256 grey levels only applies to display on the monitor though; the raw image data remain intact. During film output the full image information is available.

Calling up the function window

N O T E *When you open the function window, the 'Reset' and 'Invert' symbol buttons disappear from the side function bar. These same functions can now be found at the bottom of the function window.*

1 Mark the image on the display area and, if necessary, select a DRR processing protocol in the 'Processing protocols' window (see Fig. 5.3).

2 Click this symbol in the side function bar.
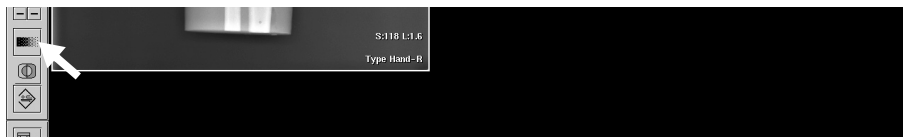
- The following window appears, according to the selected processing technique.

	Display of the function curve for contrast and brightness
	Setting the window values with sliders or by entering grey levels
WW 76.67 WL 41.67	Numerical inputs of window values (WW/WL) (Window width = WW, window level = WL)
	Invert image
	Reset the processing protocol to the default settings
Exit	Close window

Fig. 6.19 'DRR' window

Selecting preset curves for contrast and brightness

You can select one of three preset curves. With curve 2, the medically relevant structures of a mammography, for example, can be depicted optimally.
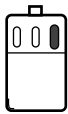
Selecting curves

1   With the **right** mouse button, select a preset curve from one to three out of the list selection.
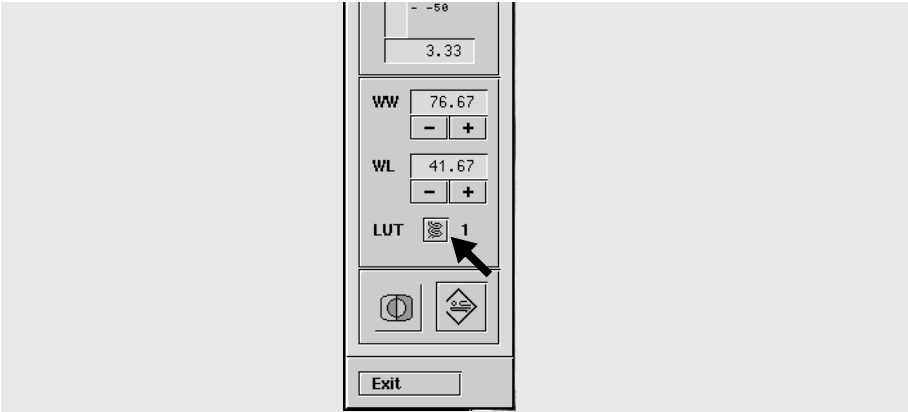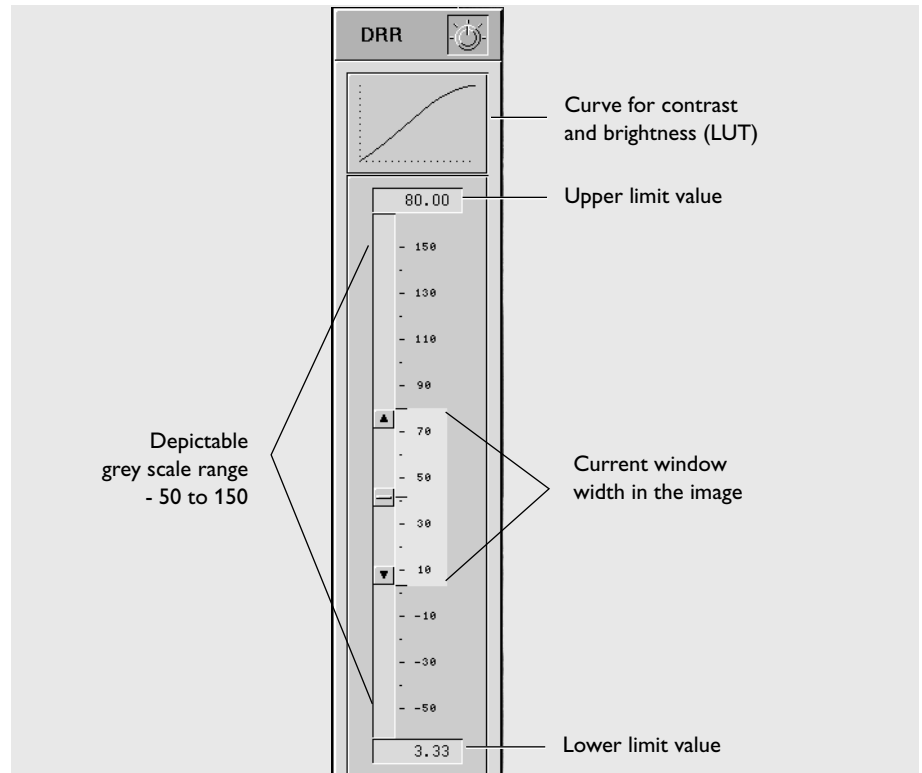

Fig. 6.20 Selecting LUT curves

The new shape of the curve for contrast and brightness is displayed and the marked image is depicted accordingly.

Curve	Application
1	For all CR images
2	For mammographic images
3	For THORAVISION images

Setting the window values with sliders

You can set the shape and position of the curve for contrast and brightness using the sliders in the DRR function window. The scale of depictable grey levels runs from -50 to 150. You can enlarge/reduce or move the depicted grey scale range (window width). The centre slider marks the window level and makes it possible to slide the entire window and thus change the brightness.

**Fig. 6.21** Setting window values

Setting window values with sliders

1   Enlarge, reduce or move the window with the help of slider controls (see page 3-18).

2   You can enter the upper and lower limit values numerically. Confirm the numerical entries with the Enter key.

The new shape of the curve is displayed, and the marked image is depicted accordingly.

Entering window values numerically

Alternatively, you can enter WW/WL values numerically.

1   Use the (+/-) keys or enter the required values numerically and confirm with
the Enter key.
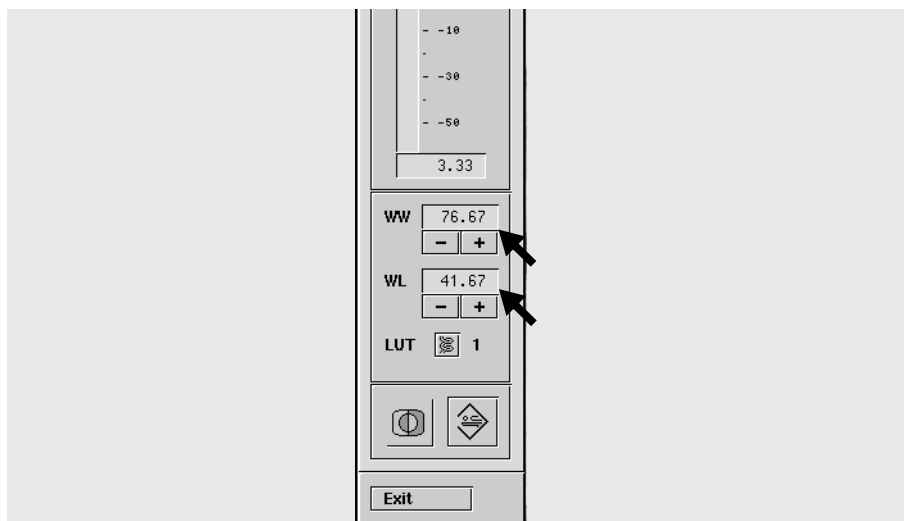
Fig. 6.22 Setting W/L values

The new shape of the curve for contrast and brightness is displayed, and the
marked image is depicted accordingly.

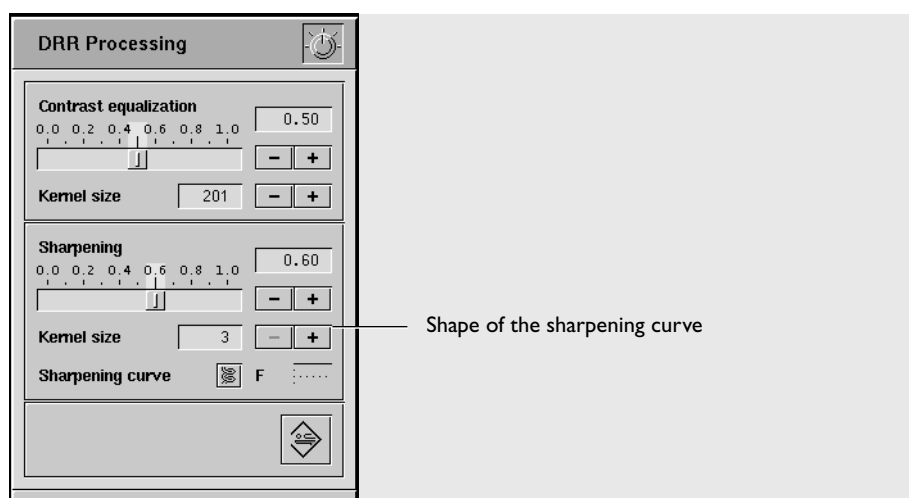## 6.3.2   Setting the contrast equalisation and focus

You can set the contrast equalisation to reduce the general contrast and thus create space for the depiction of finer details. In addition, it is possible to set the contour definition so as to enhance only the finest structures.

Opening the function window

1 Mark the image to be processed on the display area and click this symbol button.

• The following window appears, according to the processing technique.

Shape of the sharpening curve

Fig. 6.23 DRR function window

You will learn how to change the parameters in the following sections.

Adapting the contrast equalisation

For the DRR method, a contrast equalisation is created by producing a negative mask of general image details. The level of contrast equalisation can be adjusted using the appropriate slider.

An example of this: A foot exposure in the area of the ankle has a much higher anatomic density than the toes. Using the DRR method, the details in the ankle joint are depicted as darker and the toes as lighter. Structures which become visible using the UM technique only after adjusting the contrast and brightness, are recognizable using the DRR method without any manual adjustments. Through contrast equalisation, more grey levels are available for the representation of details.

The decisive factor for the production of the negative mask is firstly the size of the body region examined. If this is a large surface body part, such as the abdomen, a larger matrix is used to calculate the unfocussed image than for smaller body parts, such as a hand. The matrix size used is influenced by the kernel size. As a general rule, large-area anatomy = large kernel size, small body parts = small kernel size.

Adapting the contrast equalisation

1   Use the slider or enter numerical values and confirm with the Enter key.
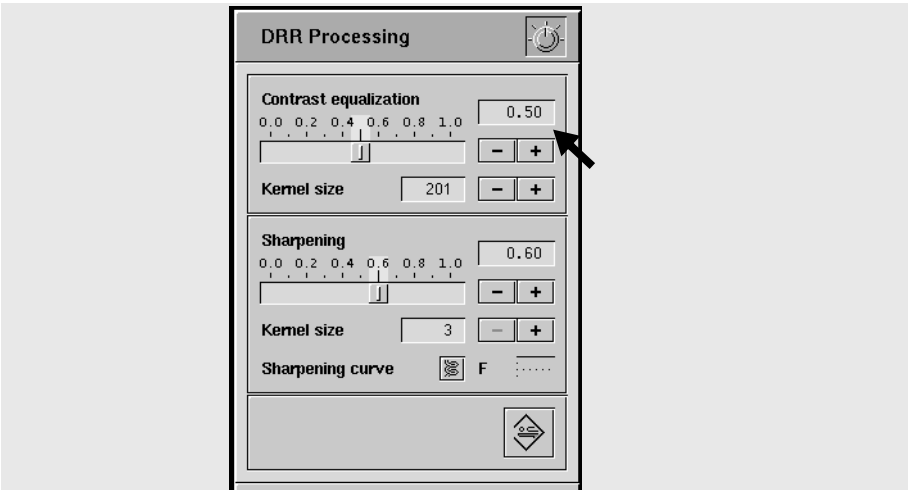

Fig. 6.24 Applying contrast equalisation

The marked image is depicted accordingly.

Adapting the sharpness

The sharpening control permits very fine details in the image to be emphasized. The effect of sharpness enhancement is usually only recognisable on screen in enlargement.

The different sharpening curves can be used to suppress the enhancement of particular light areas in order to avoid intensification of the noise. For further information on this topic refer to the section „Selecting the beta curve" on page 5-37.

The filter kernel size is used to vary the spatial frequency of the structures to be enhanced. Values can range from 3 to 9; only odd numbers are allowed.
- Values from 3 to 5 - Enhancement of very fine structures (high spatial frequencies).
- Values from 5 to 7 - Enhancement of medium structures (medium spatial frequencies).
- Values from 7 to 9 - Enhancement of very general structures (low spatial frequencies).

Unlike the RN values in the UM technique, filter kernel size here is the actual kernel size. RN values are related reciprocally to filter kernel size; small filter kernel sizes therefore intensify fine structures.

Adapting the sharpness

1 Use the slide controls or enter numerical values, then press Enter to confirm.

2 Specify the value for the filter kernel size.

3 Select a sharpening curve in the list selection (see page 5-37).
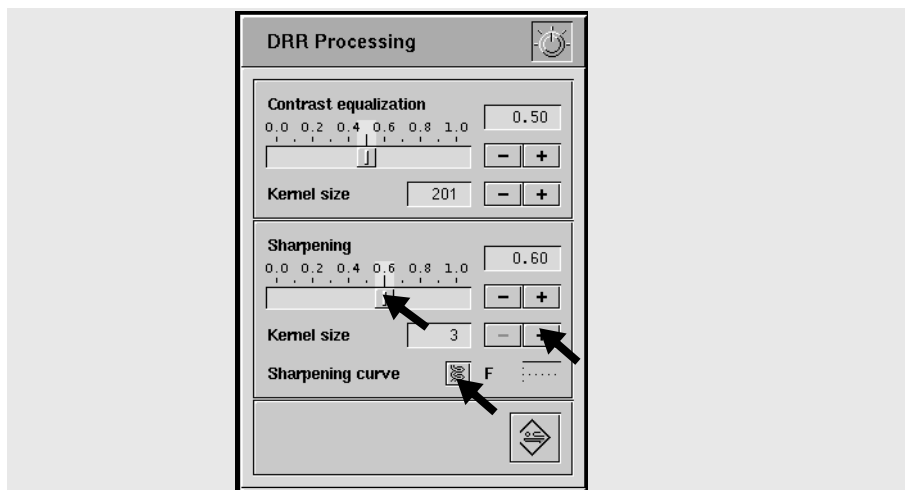
Fig. 6.25 Adapting sharpness

The marked image is depicted accordingly.

6.4   # Working with the UM technique

With the help of the UM technique (Unsharp Masking technique), you can optimise the **contrast characteristic** and the weighting of specific **spatial frequencies** in the marked image. Before image optimisation, you can use a histogram of the region of interest to determine the grey scale range depicted in it.

6.4.1   ## Adjusting the contrast characteristic

Good image reproduction is typified by an adapted shape of the LUT function curve (Look Up Table) within the grey scale range of interest. Using the parameters **GT**, **GS**, **GA** and **GC** you can select the basic type of a function curve and then edit its shape.
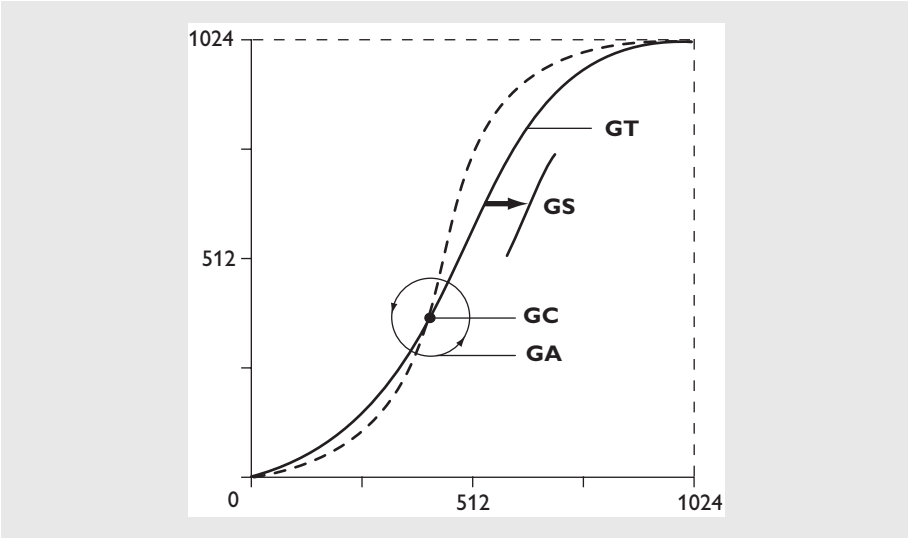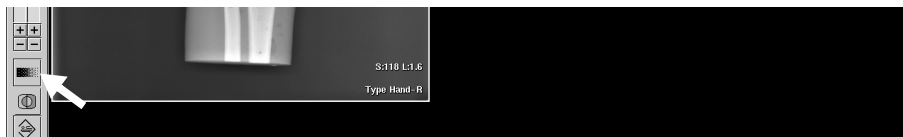

Fig. 6.26 Editing the LUT function curve

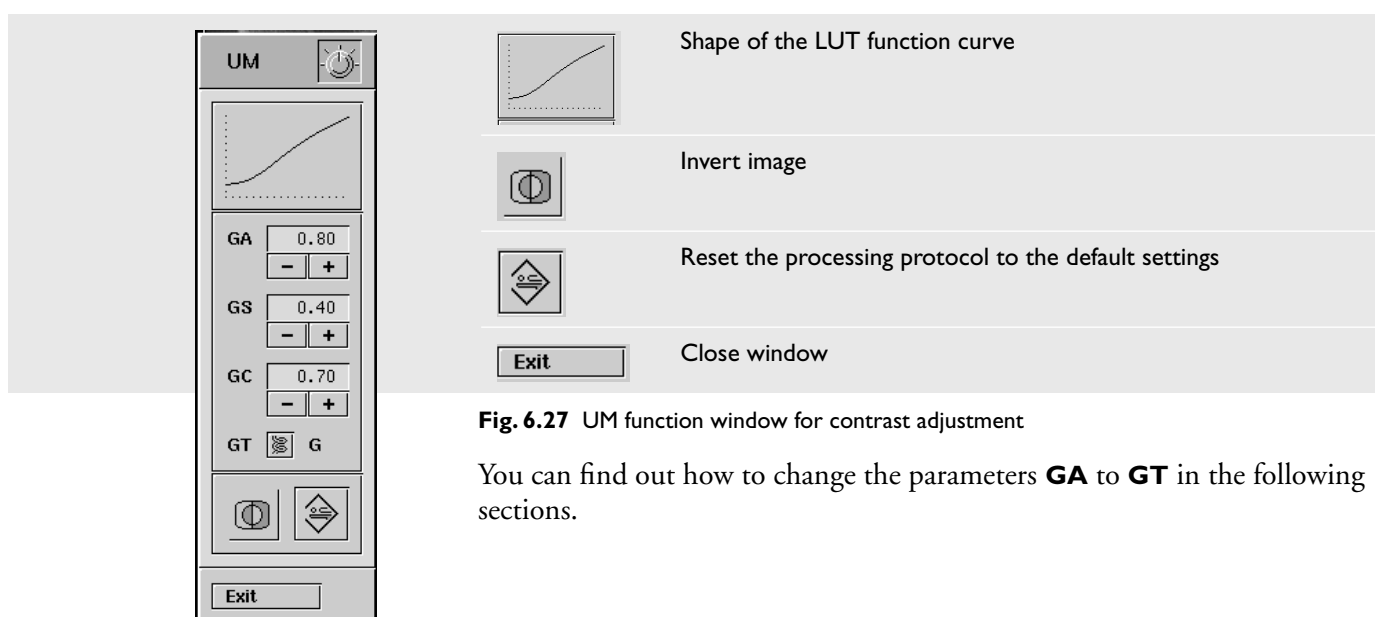|	
GT (Gamma Type)	Determines the basic form of the curve
GS (Density Shift)	Moves the curve horizontally and thus changes the brightness of the entire image
GC (Rotation Center)	Determines the point of rotation of the curve (GA)
GA (Rotation Amount)	Rotates the curve around the point GC

Calling up the function window

NOTE *When you open the function window, the 'Reset' and 'Invert' symbol buttons disappear from the side function bar. The same functions can now be found at the bottom of the function window.*

1 Mark the image to be processed on the display area and, if necessary, select a UM processing protocol in the 'Processing protocols' window.

2 Click this symbol in the side function bar.

• The following window appears, according to the processing technique.

	Shape of the LUT function curve
	Invert image
	Reset the processing protocol to the default settings
Exit	Close window

Fig. 6.27 UM function window for contrast adjustment

You can find out how to change the parameters **GA** to **GT** in the following sections.

Selecting the slope of the function curve

Via the **GA** (Rotation Amount) value, you can rotate the curve around the **GC** (Rotation Centre) point.
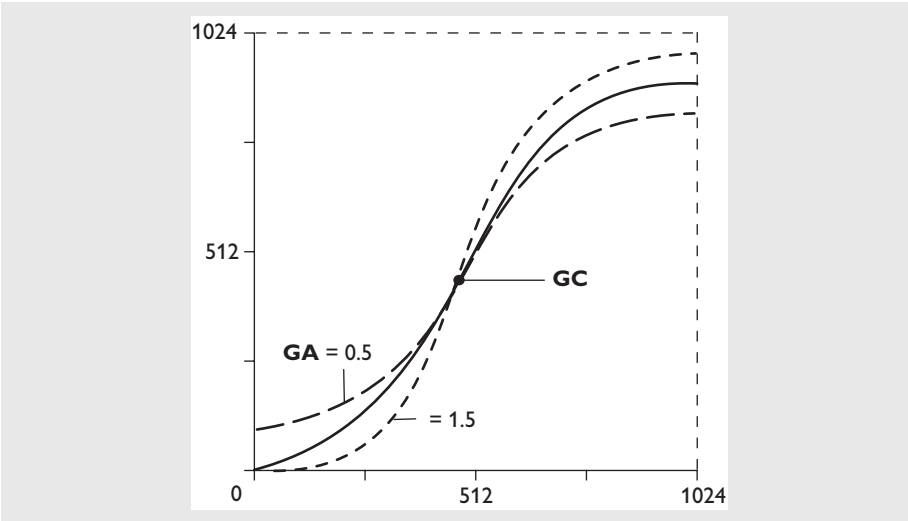

Fig. 6.28 GA factor

During rotation, the image contrast changes more markedly in the ranges far away from **GC** than in the near **GC** ones. The value range for **GA** is between 0.1 and 4.0. The greater the **GA** the steeper curve and thus the greater the image contrast.

Selecting the slope

1   Use the (+/-) buttons or enter a numerical value and confirm with the Enter key.
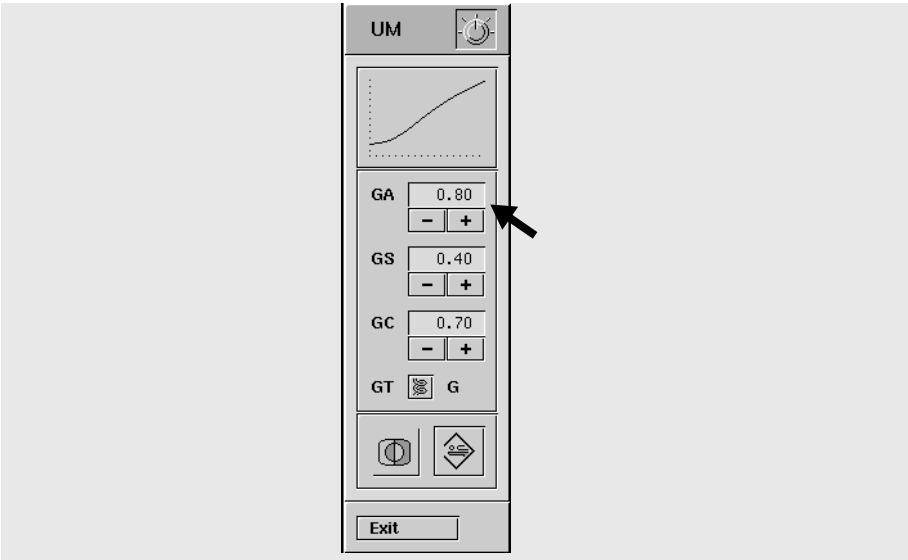

Fig. 6.29 Selecting the 'GA' factor

The marked image is depicted accordingly.

Moving the function curve (LUT)

By changing the value for **GS** (Density Shift), you move the curve to the left or right and thus influence the brightness of the image. Larger **GS** values cause a brighter image impression, smaller values a darker one. The value range lies between -1.44 and 1.44.
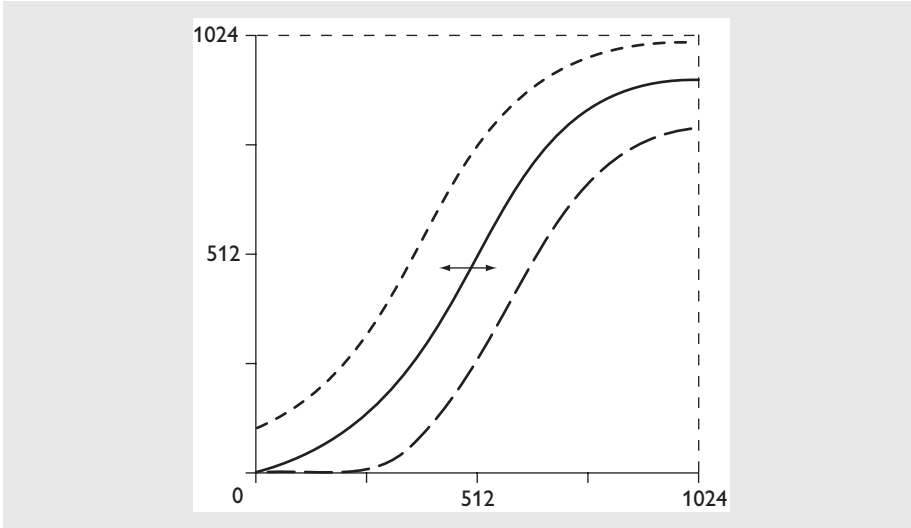

Fig. 6.30 'GS' factor

Moving the LUT

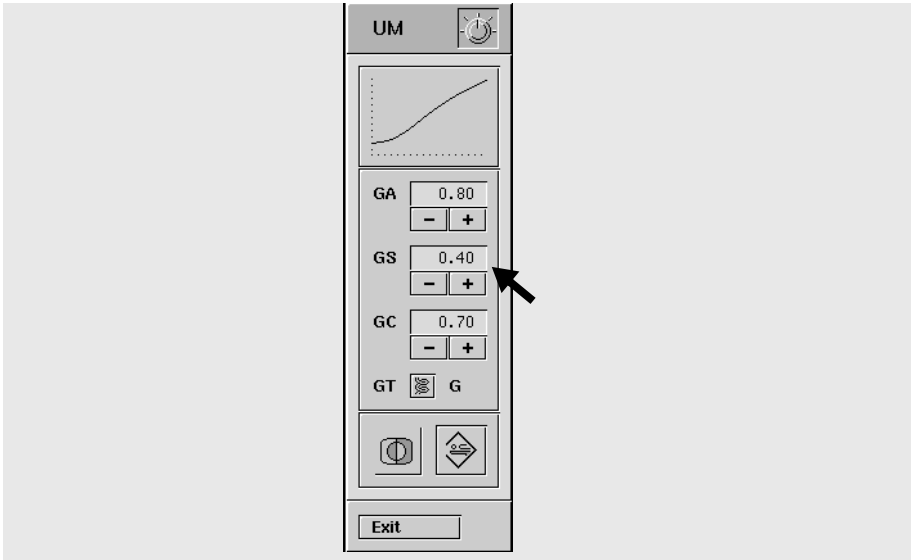1   Use the (+/-) buttons or enter a numeric value and confirm with the Enter key.

Fig. 6.31 Selecting the 'GS' factor

The marked image is depicted accordingly.

Selecting the rotation point of the function curve (LUT)

Using the G**C** (Rotation Centre) factor, the rotation point of the curve can be determined around which it can then be rotated using the values for **GA** (Rotation Amount). The value range for **GC** is between 0.3 and 2.6.
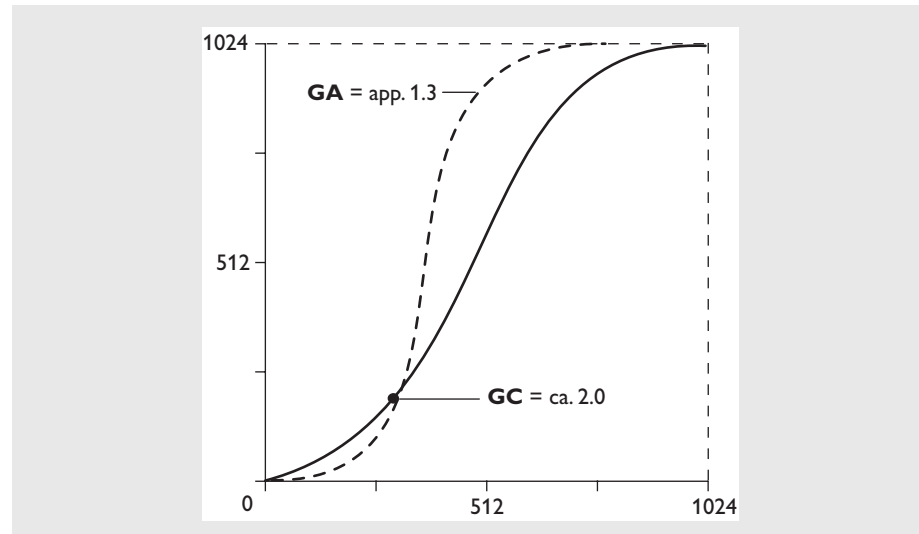
Fig. 6.32 'GC' factor

The value of **GC** should always be in the range of optical density that is important for analysis. This value can be determined as follows.

Using the measuring tool, the density of parts important to the image is first determined. For example, the lung field has a grey level of 512 for a thorax in the analysis-relevant range. This value is converted to the GC value according to the following equation.

$$ GC = \frac{\text{Measurement value x 2.64}}{1024} $$

2.64 = max. optical density

In the thorax example, the result is a GC value of 1.32. If this value is transferred into the software, the midpoint of the LUT function curve is exactly in the grey scale range of interest and an optimum result is achieved.

Selecting the rotation point

1   Use the (+/-) buttons or enter a numeric value and confirm with the Enter
    key.
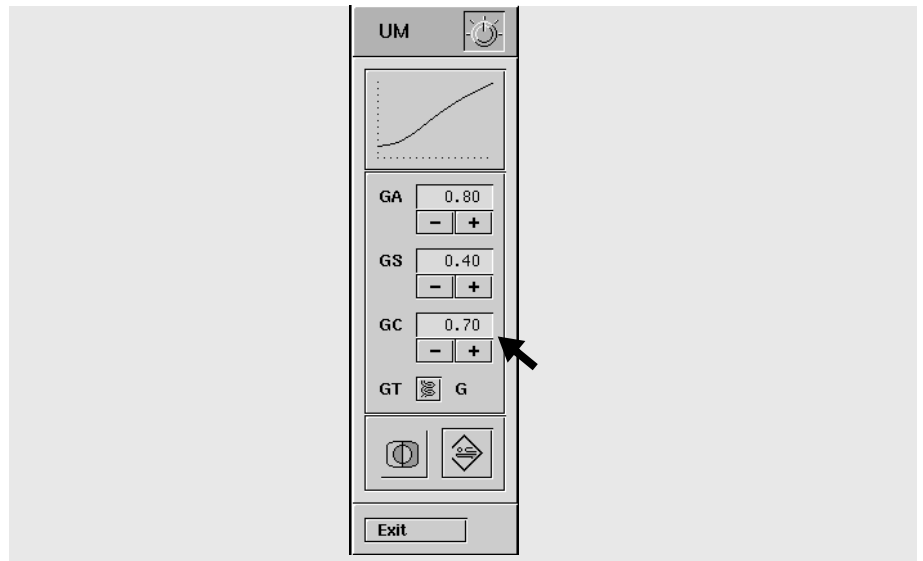
Fig. 6.33 Selecting the 'GT' factor

The marked image is depicted accordingly.

Selecting the function curve

Using the **GT** parameter, the basic type of function curve can be selected. The following graphs show the shape of function curves selectable under **GT**.
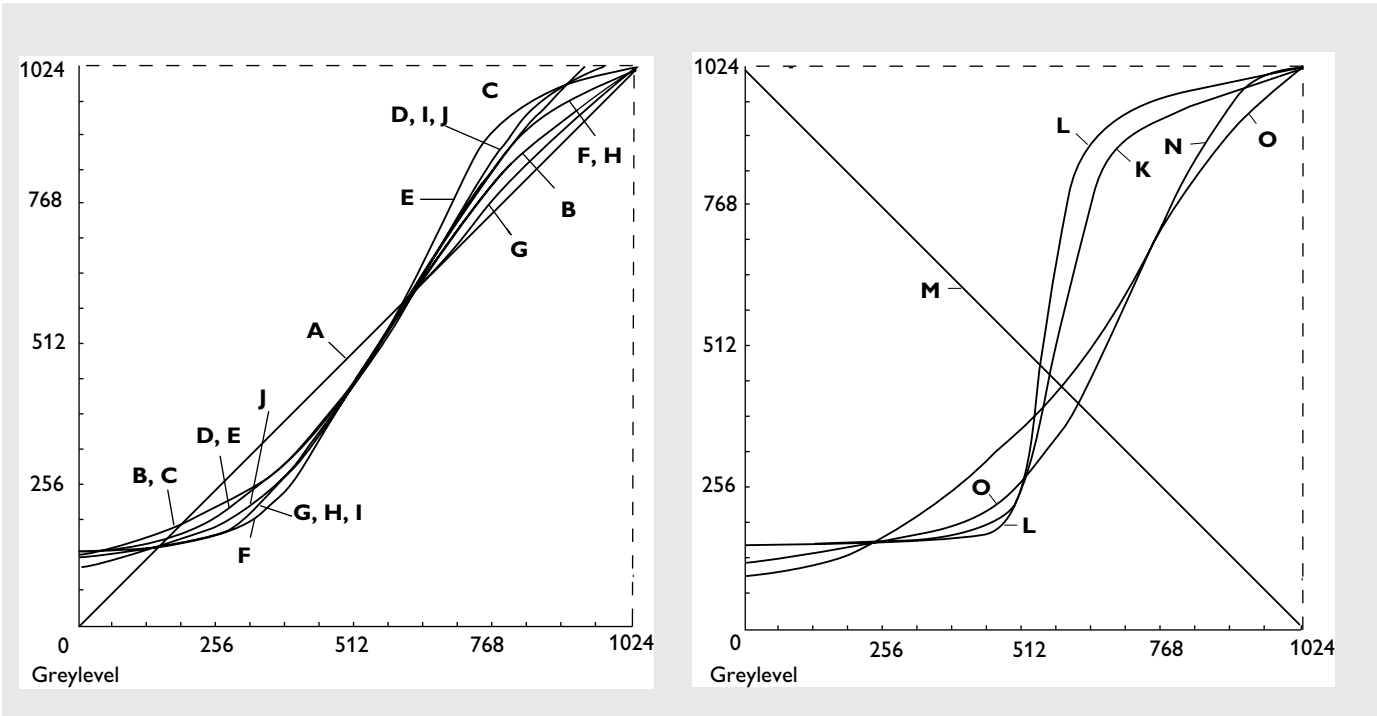

Fig. 6.34 Shape of various LUT function curves

A	Linear contrast gradation with large density range
B-J	Non-linear curves with variations of shoulder and toe angle. These contrast characteristics are used for head, neck, thorax, chest, abdomen and pelvis.
K, L	Non-linear curves with high contrast for subtraction techniques
M	Linear contrast distribution with black-white reversal; is used for inverted display
N	Non-linear contrast for stomach exposures (large differences in density)
0	Non-linear contrast for bone exposures
a, e, o	Maximum grey level depiction

The curves A to O use 2.64 optical density as the maximum grey level. To exploit the entire range of grey levels depictable on a film, the LUT curves a, e and o were implemented. With these curves, more grey levels can be depicted and therefore individually occurring contouring effects can be avoided.

Selecting the function curve

1　Select a letter from A to O from the list selection.
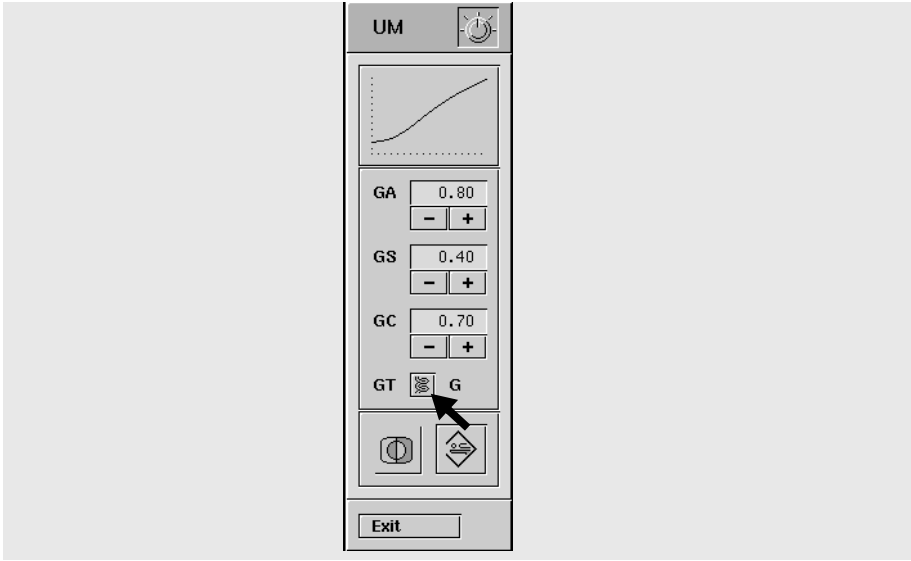
Fig. 6.35　Selecting the 'GT' factor

The marked image is depicted accordingly.

6.4.2   **Adjusting the filter functions**

Using the filter functions (factors **RN**, **RE** and **RT**), the contributions of various spatial frequencies in the original image are weighted for grey level modulation of the processed image. Structures of specific spatial frequencies can be emphasized more strongly or retained unemphasized. For processing, an unsharp low-pass filtered image is calculated, the unsharp mask, and then subtracted from the original image. The resulting difference image is superimposed onto the original image. By changing the following parameters, the shape of the beta curves is influenced.

RN (Frequency Rank)	Relevant spatial frequency for contour enhancement
RE (Frequency Enhancement)	Intensification factor for contour enhancement
RT (Frequency Type)	Curve type (beta curve)

Calling up the function window

1   Mark the image to be processed on the display area and click this symbol button.

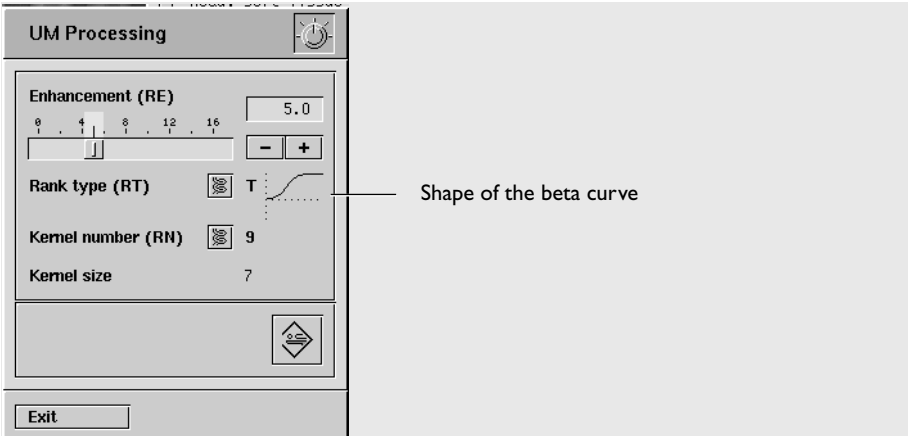•   The function window for the UM technique appears according to the assigned image processing protocol.
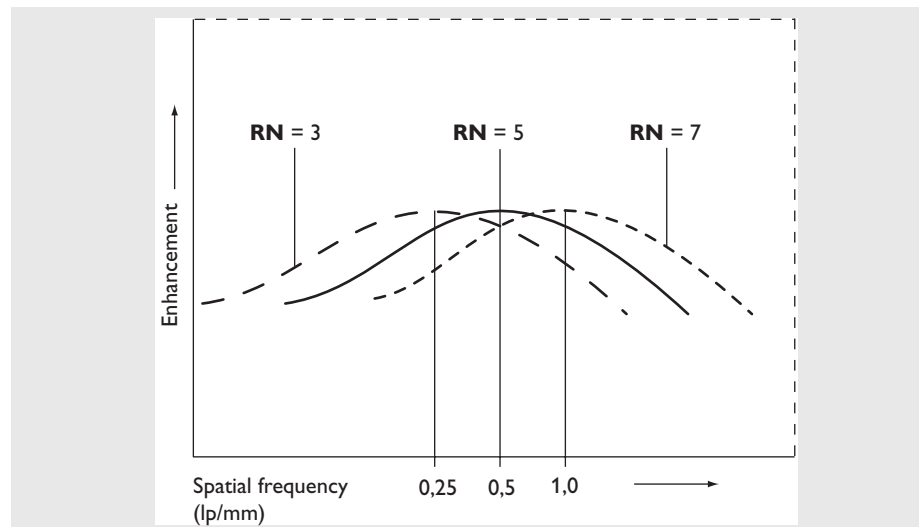

Fig. 6.36 UM function window for frequency adjustment

You can find out how to change the parameters in the following sections.

Selecting the spatial frequency

Using the **RN** (Frequency Rank) factor, you can determine the spatial frequency in lp/mm which is to be intensified in the image.


Fig. 6.37 Selection of the spatial frequencies to be intensified

For **RN** the following values apply as a guideline:

- 0 to 3 - Intensification of large structures (low spatial frequencies) such as soft tissue, kidneys or other organ contours.
- 4 to 5 - Intensification of medium-size structures (middle spatial frequencies) such as the lung field and blood vessels, bone contours and gastrointestinal tract.
- 6 to 9 - Intensification of fine structures (high spatial frequencies) such as details of bone structures and double-contrast stomach segments.

Selecting the spatial frequency

1 Select an **RN** value in the list selection.
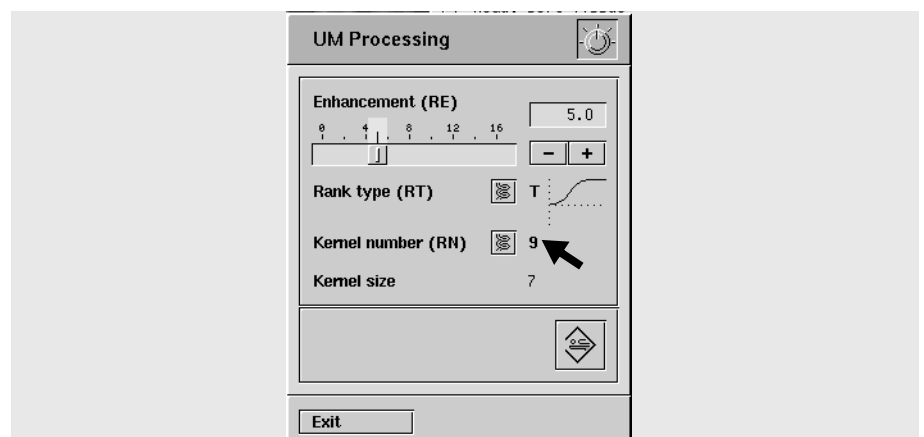
Fig. 6.38 Selecting the RN factor

The resulting kernel size is displayed. The marked image is depicted accordingly.

Selecting the intensification factor

With **RE** (Frequency Enhancement), you can enter the maximum value of the beta curve and thus determine its absolute characteristic. Low values for **RE** lead to a lower degree of enhancement; the image looks like a conventional X-ray image. High values lead to greatly contour-enhanced images. The value range is between 0 and 16.

NOTE
- *The values of RE > 1 increase the noise in the image considerably.*
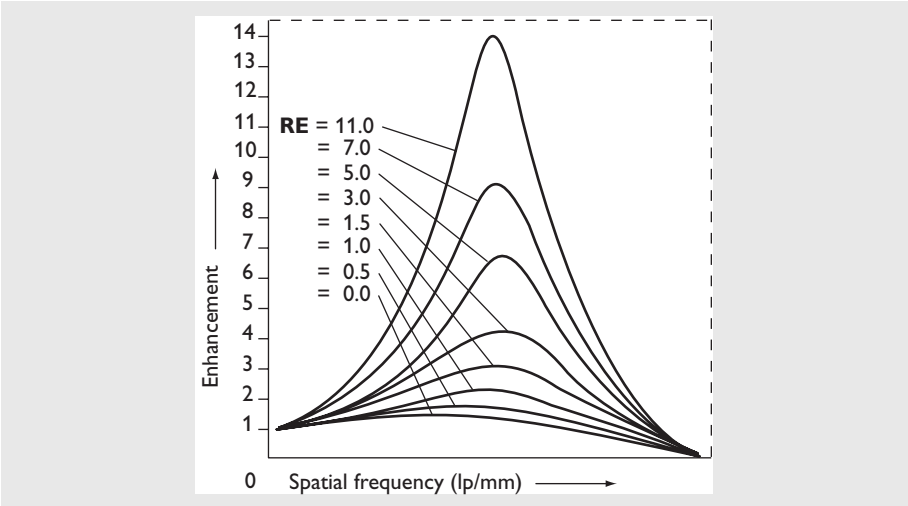- *If RE = 0, changes to RT and RN have no effect.*

Fig. 6.39 Curve shape relative to 'RE'

Selecting the intensification factor

1   Select the **RE** factor with the help of the slider control, the (+/-) buttons or through a numeric entry. Confirm numeric entries with the Enter key.
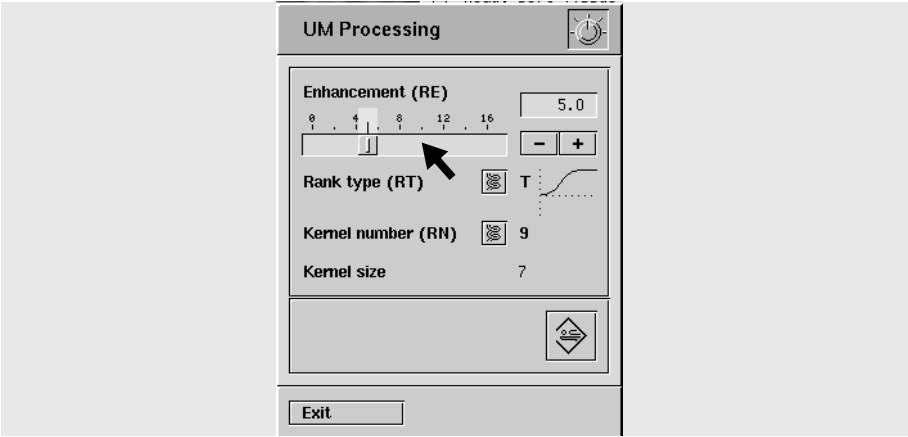

Fig. 6.40 Selecting the intensification factor

The marked image is depicted accordingly.

Selecting the beta curve

Using **RT** (Frequency Type), you determine the basic form of the beta curve. Depending on the selected beta curve, structures are enhanced with different intensity and in different ranges of optical density (also see the table on the next page). Undesirable noise is visible especially in the bright areas, therefore at a low optical density. If the contour enhancement in these areas is reduced, the noise in the image is also visibly reduced.

In the graph depicted below, the linear curve 'F' has a consistent enhancement factor of 1 over the entire range of optical density, which also intensifies the noise in the image. Looking at the 'S' curve, on the other hand, it becomes apparent, that the enhancement factor is zero for pixels with an optical density of 0 to approx. 0.5, i.e. for very bright pixels. This means pixels with this optical density remain unenhanced and are depicted as in the original image. Only at an optical density of approx. 1.3 are contours enhanced to the full extent, since they have achieved the factor 1 here. Thus, with the application of non-linear beta curves, the interfering image noise can be reduced.

The following graph shows the shape of selectable beta curves.
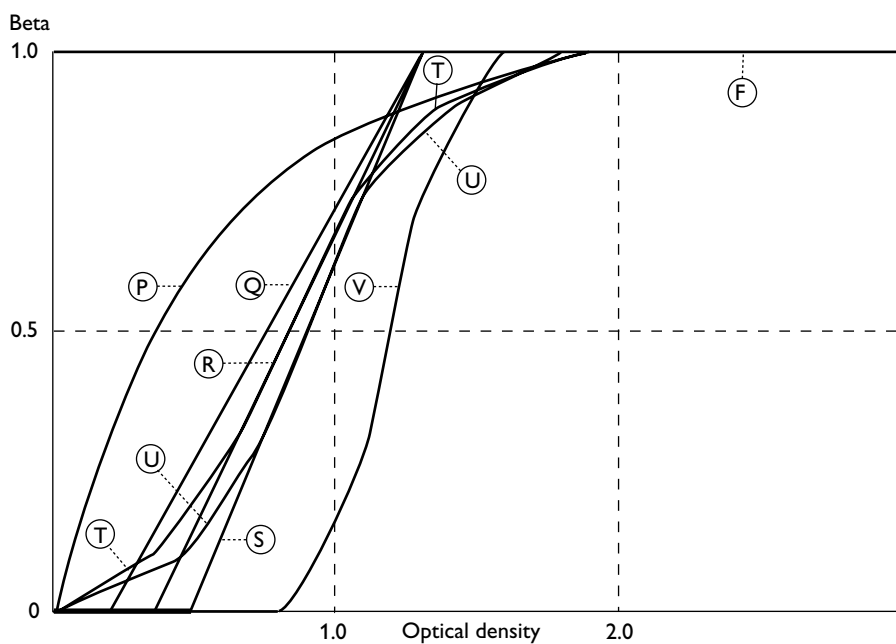
Fig. 6.41 Shape of the beta curves

Curves	Application
Q, R, S	*Soft-contoured beta curve* These beta curves demonstrate a comparatively low frequency enhancement in ranges of low optical density. Q-R-S identify a sequence of increasing soft-focus.
U, T, P	*High-definition beta curves* These beta curves demonstrate a comparatively high frequency enhancement in ranges of low optical density. U-T-P identify a series of increasing sharpness. The T curve is used to examine trabeculae.
V	This beta curve is used if the image demonstrates a high noise component.
F	Uniform contour enhancement over the entire range of optical density.
X W	Curves for special application purposes

Selecting the beta curve

1   Select a beta curve from the list selection.
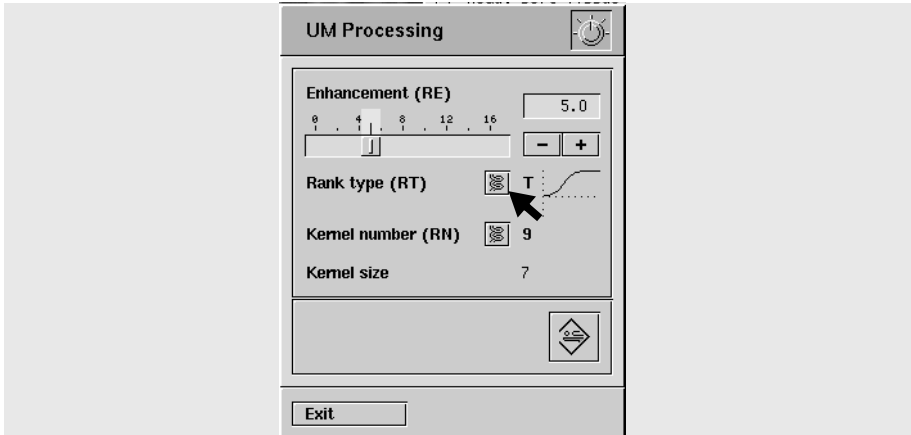
Fig. 6.42 Selecting a beta curve

The marked image is depicted accordingly.

6.5 Working with the UNIQUE technique `Option`

With the UNIQUE technique the processing functions are distributed across several windows. As with DRR, contrast and brightness can be adapted using the window technique. For further information on this topic refer to the section „Adapting the contrast/brightness characteristic" on page 5-18.

N O T E   • *Better quality results are achieved by setting the functions in the 'Unique Process-*
ing' or 'Expert Parameters' window. Philips recommends that images are optimised
using these functions only; the settings of the other functions in the toolbar on the
left-hand side should remain neutral.

• *Images which are processed using the UNIQUE technique may be exposed on the*
cassette only as single exposures. If a cassette is exposed more than once, devia-
tions from the brightness of a single exposure may arise when processing using the
UNIQUE technique. These deviations result from the unexposed areas between the
*collimations, which appear on the image plate in the case of multiple exposures.*

The original UNIQUE functions are distributed across the windows shown
below (see Abb. 5.43). The 'Unique Processing' window contains the basic
functions for setting brightness, general contrast, structure intensity and
noise reduction, whilst fine tuning is carried out using functions in the
'Expert Parameters' window.

6.5.1   Opening the function windows

The corresponding function windows can be opened if the image displayed
is allocated a UNIQUE processing protocol.

1   Mark the image on the display area and click this symbol button in the
upper toolbar. The following window appears.
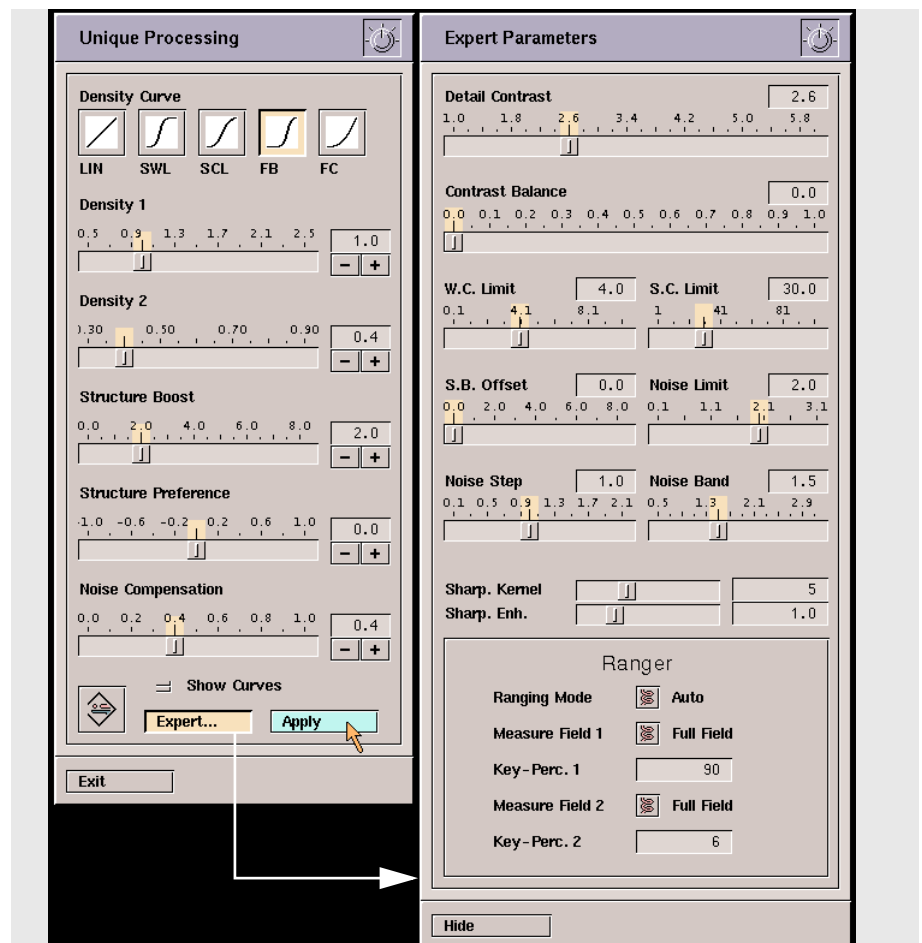
Abb. 6.43 'Unique Processing' and 'Expert Parameters' window

6.5.2   **Basic functions**

The parameters in the window 'Unique Processing' are described below.

Density Curve

In the same way as a traditional mammogram film represents dose information differently to a film for extremities, the various density curves have differing effects on the overall representation of the image in terms of global contrast and brightness. If the 'Contrast Balance' parameter is set at 0, changes in the density curve do not have a direct effect on the structure of the image, i.e. on the 'Detail Contrast', this depends rather on other parameters. The selection of the density curve is crucial as regards the representation of dark and light areas which have not been clipped.

The following density curves can be selected:
- LIN (linear)
- SWL (S-shaped wide latitude)
- SCL (S-shaped chest lateral)
- FB (film bone), typical film bone representation
- FC (film chest), typical film pulmonary representation

Density 1

The system automatically determines the dose/pixel value key percentage for anatomically interesting details. Therefore, for example, the key percentage of an image of a leg would be situated on the bone substance. The brightness value on this key percentage is allocated a corresponding optical density on the film.

Density 2

(only available if the ranger is in auto mode)

In auto mode, following the histogram analysis, the density curve is fixed between two key percentages on the image. The first key percentage is defined by the parameter 'Density 1' and is allocated a particular optical density. In the same way, a second key percentage is defined by the 'Density 2' parameter. The optical density of this key percentage, for example in a thorax image, should be in the abdominal area.

Gamma

(not available if the ranger is in auto mode)

The gamma value determines the increase in the density curve in the key percentage. As with the traditional film technique, with steep gamma curves (mammo) or flat gamma curves (bone), this value has an influence on global contrast in the low-pass area and consequently also on the dynamic range. The gamma value does not directly influence the image's detail contrast. The higher the value is set, the greater the global contrast.

Structure Boost

Weaker structures (low contrast), where the values of neighbouring pixels are only slightly different, are boosted with this parameter. For example, micro-calcifications against a light background would be barely visible without this boosting function.

Structure Preference

A low level of contrast occurs with a variety of structure sizes. The structure size which is to be emphasised by the structure boost function is controlled using the structure preference. Values below 0 accentuate general structures such as large fractures. Values greater than 0 emphasise finer structures to allow better visualisation of calcification.

Noise Compensation

The more the structures in the image are emphasised, the greater the interference from noise when the dose is low. To reduce the effects of this, the enhancement of structures can be reduced in low dose, light areas. For example, the noise in a processed thorax image is greater in the mediastinum than in the neighbouring ribs. By enlarging these parameters there is less structure boosting in light areas and consequently a reduction in noise.

6.5.3   Expert Parameters

The parameters in the window 'Expert Parameters' are described below.

N O T E   *The functions in this window are to be used by expert users only.*

Detail Contrast

This value influences the representation of structures in the image. It has no effect on the global contrast but does influence the structures in terms of their environment. When detail contrast and gamma agree, the representation of the image corresponds to that of a traditional film (at contrast balance 1).

Contrast Balance

The contrast balance influences the representation of the detail contrast in areas of varying brightness and density. If the value is 1, then the detail contrast is only optimal at the key percentage; it is reduced in the light and dark areas (typical film representation). If the contrast balance is 0, the detail contrast is the same in all areas of brightness and density (harmonised contrast). Using the slider, it is possible to move smoothly between the two extremes.

W.C. Limit (Weak Contrast limit)

This parameter defines the area of weak contrasts to be enhanced by the structure boost. As a limiting value, it determines the contrasts to be added to areas of weak contrast so that they are particulary enhanced. The weak contrast area is normally around < 5% within a decade. The transition to greater contrasts, which are not emphasised to the same extent, occurs as a smooth curve.

S.C. Limit (Strong Contrast limit)

This parameter determines the limiting value of strong contrasts in the image. When there are large differences in contrast in the image (e.g. on the sharp edges of metal implants), the contrast boost has to be limited in order to avoid artefacts. Using this slider, it is possible to set the contrast value as a percentage at the point where the boosting effect is to be reduced. A value of 10% is advisable.

S.B. Offset (Structure Boost)

This parameter controls an additional structure boost over all frequency bands. Whilst the structure preference determines which structure sizes are to be particularly emphasised, the S.B. offset carries out additional uniform boosting on all frequency bands. Consequently, when the structure preference is 0, the parameters 'Structure Boost' and 'S.B. Offset' have the same influence on image representation. This setting is particularly important in mammography.

Noise Limit

The smaller the dose, the worse the signal-to-noise ratio. As a result of this, observers note stronger noise in the light areas with low dosage compared to the darker areas. As is described under 'Noise Compensation', noise in these areas is to be reduced by a decrease in the structure boost. The boost limit defines the extent of the low dose area. The greater this value, the more the reduced structure boost limit extends into the higher dose area.

Noise Step

With this parameter the transition between areas with reduced and areas with normal structure boost can be defined. A small value signifies a very small transition area. The smaller the value, the greater the danger that artefacts will be generated in areas with only slight pixel differences. These areas have highly emphasised zones, whereas neighbouring structures are smooth.

Noise Band

This parameter is used to determine the local frequency band to which the noise is to be reduced. During processing, the image information is divided into different local frequency bands (subbands). Each band represents an area of specific structure sizes in the image. Noise is to be reduced in the high-frequency bands (these contain small details) by decreasing the structure boost. With this parameter, it is possible to determine on which subbands the structure boost is to be effective.

Sharpness Filter (Sharpness Kernel and Sharpness Enhancement)
The sharpness filter functions allow the sharpness of the raw image to be enhanced before it is processed using the UNIQUE technique. This allows a certain unsharpness in the image, which is dependent on the plate reader type, to be eliminated. Each plate reader works with its own transfer function (MTF) which is, amongst other things, determined by the dose and the distance between pixels. The plate reader's specific MTF can be compensated with the help of the sharpness filter.

Sharpness Kernel

The way the sharpness kernel works is similar to the UM technique where a variable kernel is used as an unsharp mask in order to generate low-pass images. The larger the kernel selected, the larger the size of the structures affected.

Sharpness Enhancement

This parameter determines the level of structure boosting.

Ranger

The functions in this group field serve to set the image's key percentage. The key percentage is the area of the pixel values or dose in which the anatomically interesting details are displayed. The key percentage should be of mid optical density and lie between 1.3 and 1.7. The brightness of the key percentage is not affected by changes in the gamma value.
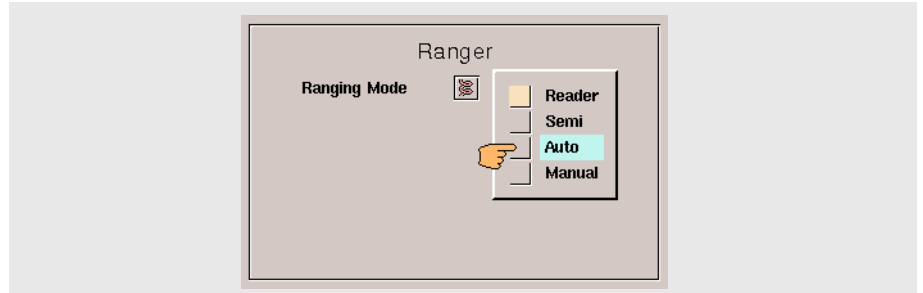
Abb. 6.44 Ranger

Ranging Mode

N O T E **The following modes only apply to the UNIQUE technique and not to the plate reader readout modes. The various plate reader modes have no influence on UNIQUE technique image processing.**

- Semi
  In this mode, following a histogram analysis, a single key percentage is determined in the image.
- Auto
  In this mode, following a histogram analysis, two key percentages are determined in the image, a density curve is then defined between these key percentages.
- Reader
  In this mode, a key percentage is defined based on the S values (sensitivity) and L values (lightness) transmitted from the plate reader. In certain circumstances, concessions in quality are unavoidable if this method is used since no further histogram analyses are conducted in order to identify the key percentage on the EasyVision workstation.
- Manual
  This mode is suitable for manually determining a key percentage. When the key percentage is automatically determined, it is always assumed that for each image an exposure is produced. An image plate can, however, be used for multiple exposures. In this and other special cases, the key percentage can therefore not be optimally determined. The user thus has the possibility of determining the key percentage according to self-defined criteria.

Ranger in semi and auto mode

Measure Field

In semi and auto mode a measure field is required in order to determine the key percentage, the field is subjected to a histogram analysis and is then assessed. The areas at the edge of the image are removed beforehand for all film types.
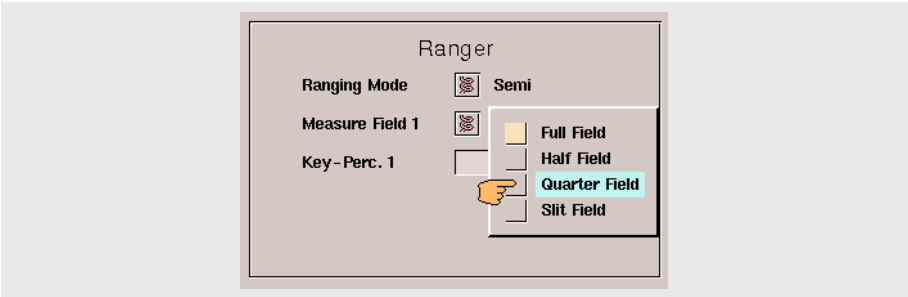

Abb. 6.45 Selecting the Measure Field

- Full Field
  The entire image is used as the measure field.
- Half Field
  The measure field takes up around half of the central part of the image.
- Quarter Field
  The measure field takes up around a quarter of the central part of the image.
- Slit Field
  The measure field takes up a thin rectangular area in the central part of the image.

Key percentage

This parameter determines the value at which the key percentage is to be set in the pixel histogram. In the semi mode a single key percentage is used and in the auto mode two.
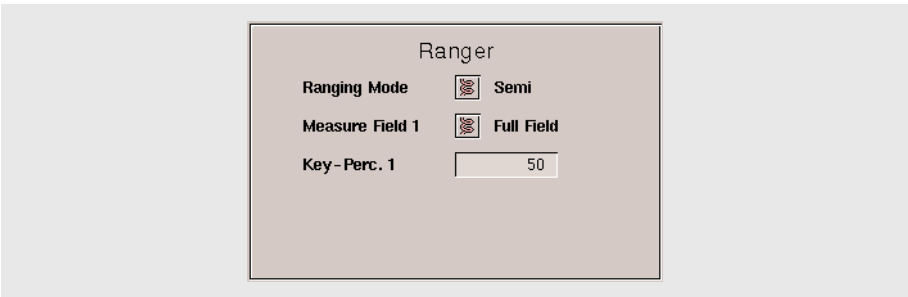
Abb. 6.46 Key percentage in semi mode

Dose Center (only in manual mode)

In manual mode, the user is able to determine the key percentage himself using the dose center. The dose center represents the key percentage in decade units. Changing this value firstly results in the dose center being identified on the image displayed. Only after clicking the 'Apply' button is the new key percentage applied to the image.
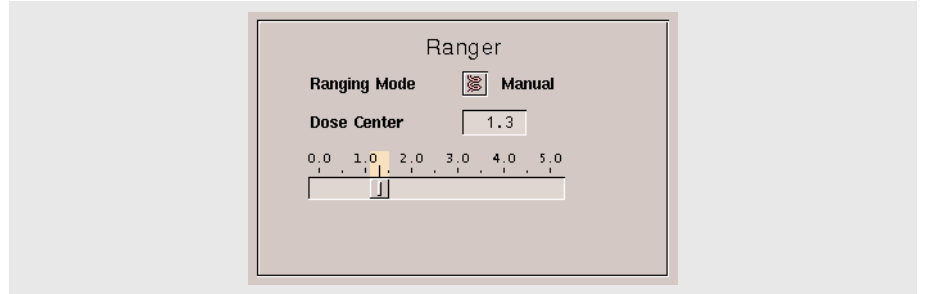
Fig. 6.47 Manually determining the key percentage

Chapter 7   Editing images 7-3

7 Editing images

This chapter describes functions with which you can examine and edit the images displayed. Among other things, you can perform various measurements, set electronic shutters manually or position labels for localisation on the image.
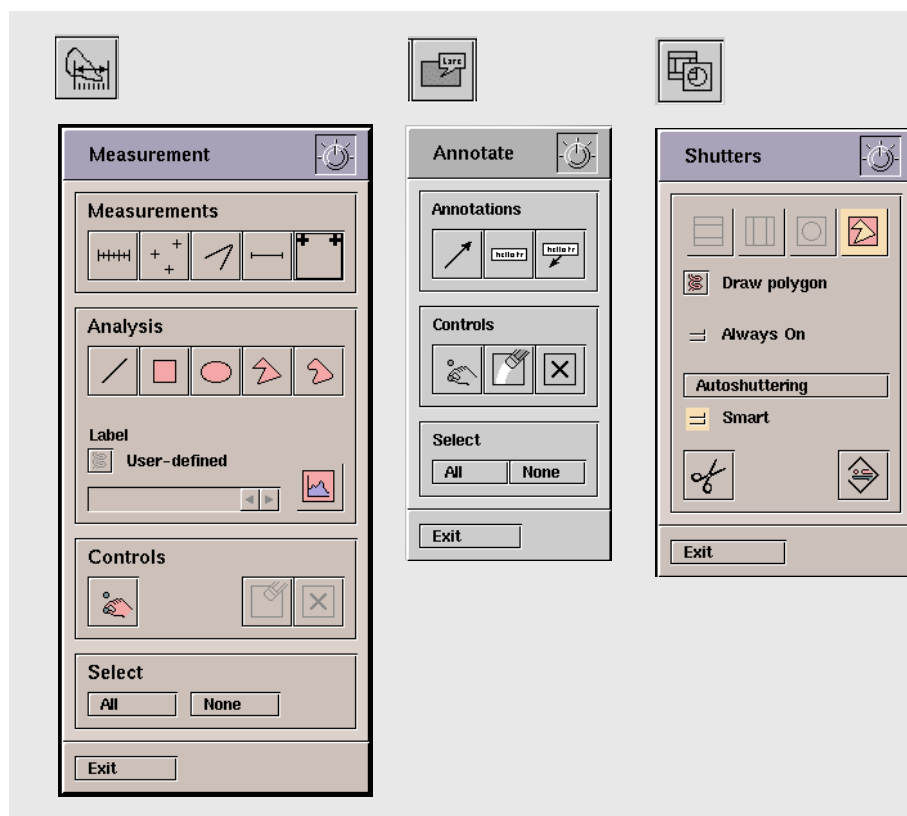
Fig. 7.1 Functions for editing images

7.1   Resetting changes

In the main window of the PCR application, you will find several functions for resetting changes. All manual changes made after processing of an image are stored in addition to the original image. When resetting changes, the original values are reactivated. The various functions for resetting can be distinguished as follows.

- *Global reset*
  Permits resetting of all processing functions for the top and side toolbars, with the exception of measurements, annotations and magnification. You will find the two symbol keys for this in the top toolbar of the PCR application.
- *Resetting the image display group function*
  The corresponding symbol key in the side function bar permits resetting of a function group. At the same time, the following functions are reset: The sliders for contrast and brightness as well as the key functions for LUT, inversion, contour enhancement and image processing.
- *Resetting window functions*
  In the various function windows, you will find the same symbol keys as in the toolbar. They are used to reset the respective functions within a window.
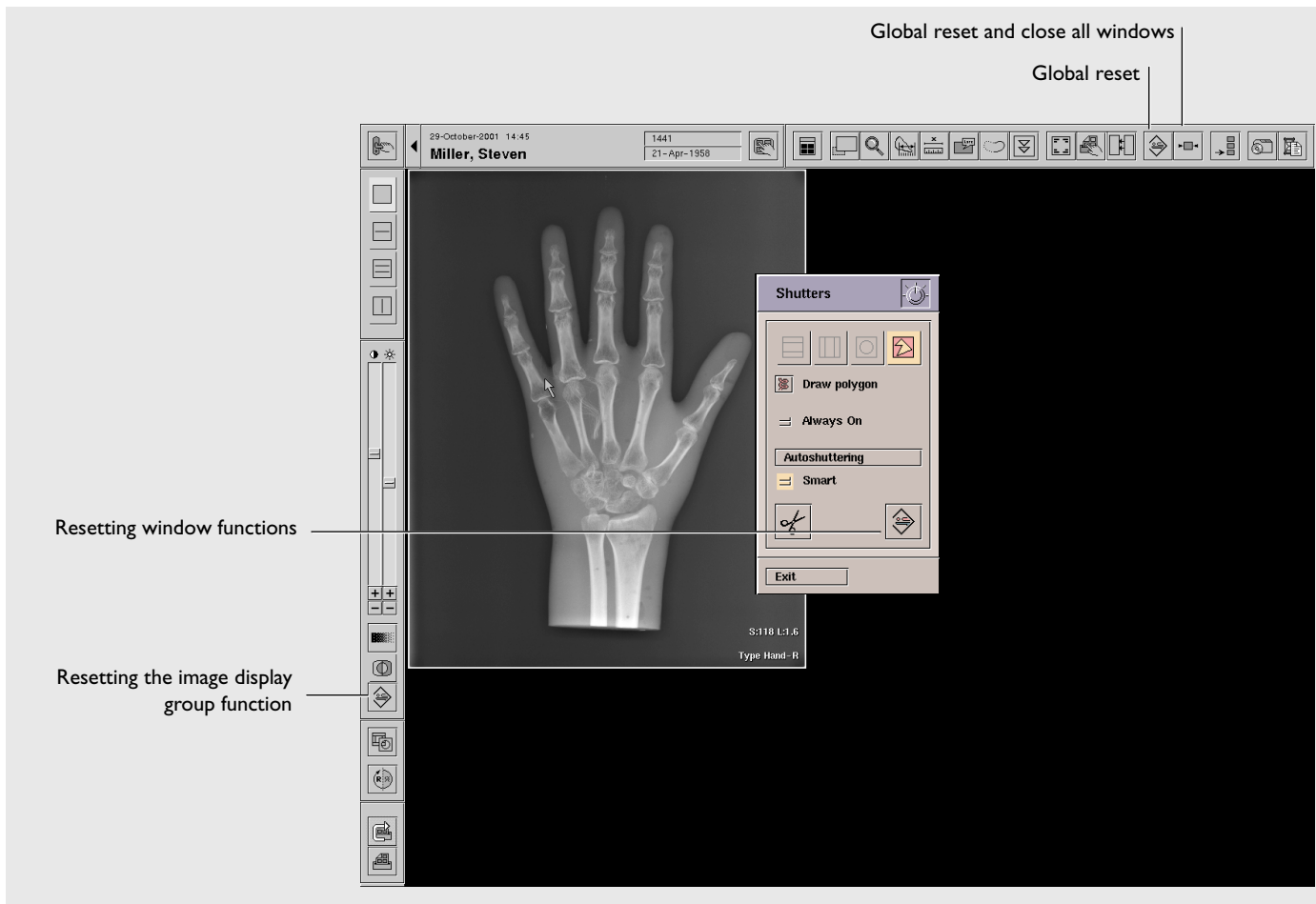

Fig. 7.2 Reset in the main window

7.2   Creating and adjusting shutters

Shutters can be used to remove unimportant areas from the image and to reduce the information on the image to those areas which are relevant for diagnosis.

7.2.1   About the diaphragm control facility

The PCR has an automatic diaphragm control facility which, using a collimation recognition function, equips the incoming images with an electronic shutter. The collimation recognition function searches the image for clear, straight light/dark boundaries. As a basic system setting, it is able to create horizontal and/or vertical or polygon shutters and dependably recognise mechanical collimations which run approximately parallel to the margins of the cassette. Due to the wide variety of collimation types, it may be necessary in specific cases to adjust the automatically placed shutters manually.
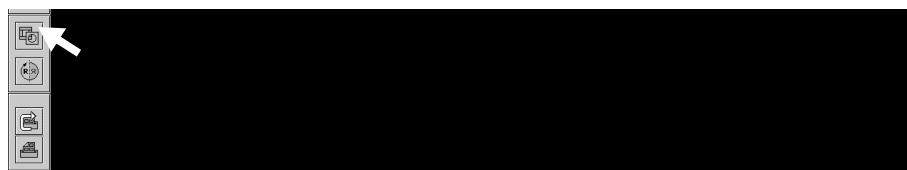
N O T E

- *Partial collimation of the markers on the left and right sometimes occurs if the polygon shutters are positioned too close to the edge of the image.*
- *The automatic diaphragm control facility is only intended for single images. If several images are exposed onto an image plate, the automatic diaphragm control facility is not able to work properly. Alternatively the pictures may be separated (see page 7-10).*

The automatic diaphragm control facility can also be activated for individual images with the 'Autoshuttering' function activated (see page 7-7).

7.2.2   Selecting manual shutter

Various electronic shutters can be activated and their shape and size subsequently processed.

1   Mark the image(s) on the display area (see page 4-9).
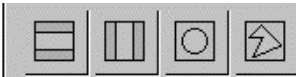
2   Click this symbol button.

• The following window appears.

		Set/remove horizontal shutter
		Set/remove vertical shutter
		Set/remove circular shutter
		Set/remove polygon shutter
	Draw polygon	For polygon shutters select either 'Default Polygon' or 'Default Bezier' or draw polygon or bezier (see page 7-8).
	Always On	As the soon as the 'Shutters' window is opened, horizontal and vertical shutters are activated for new images. This function only works with new images which have not yet been assigned shutters.
	Autoshuttering	Use the automatic diaphragm control facility
	Smart	Activate if the automatic diaphragm control facility is to generate polygon shutters. If deactivated, the automatic diaphragm control facility function only generates horizontal and vertical shutters.
		Cut/separate images (see page 7-10)
		Reset to original setting
	Exit	Apply settings, close window

Fig. 7.3 'Shutters' window

3   Select one or a combination of various shutter types.

When you activate the polygon shutter, you can choose between polygon shutter and bezier shutter in the selection list.

The corresponding shutter is created.

7.2.3   Using the automatic diaphragm control facility

The automatic diaphragm control facility is used with the 'Autoshuttering' function, which uses a collimation recognition function to set an appropriate shutter or shutter combination. The shape and size of the shutter is orientated to the mechanical collimation. The "Smart" option must be activated in order to set a polygon shutter.

N O T E

- *Partial collimation of the markers on the left and right sometimes occurs if the polygon shutters are positioned too close to the edge of the image.*
- *If the automatic diaphragm control facility for polygon diaphragms (activated Smart) does not find any oblique mechanical collimations in the image, no diaphragm is created.*

Selecting Autoshuttering

1   Mark the image on the display area (see page 4-9).

2   If you wish to create a polygon diaphragm activate the "Smart" option.

3   Click the 'Autoshuttering' button in the 'Shutters' window.

If you wish to create a polygon shutter, the 'Smart' option must be activated beforehand. If the 'Smart' option is deactivated, only vertical or horizontal shutters or a combination of these two can be created.

Fig. 7.4 Automatic diaphragm control facility with Smart

The appropriate shutter is created.

7.2.4   **Drawing Shutters**

You can draw polygon or bezier shutters with flexible shapes.

1   Select either the 'Draw polygon' or 'Draw bezier' option from the 'Shutters' window.

2   Click the polygon shutter symbol.

3   Click on the image to create the starting point. Click on the image to create each additional node, complete the shutter by finally clicking the starting point.
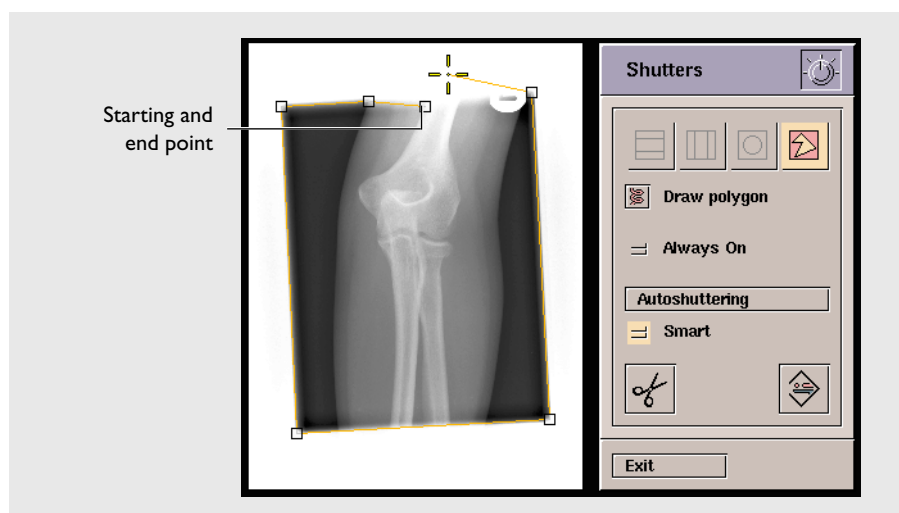
Fig. 7.5 Draw polygon

7.2.5   **Adjusting the shutters**

Depending on the shutter type, you can adjust the size, position and shape of the shutter.

Circular shutters

1   Click at any point on the circular line and drag the image shutter with the mouse button depressed to the required size.
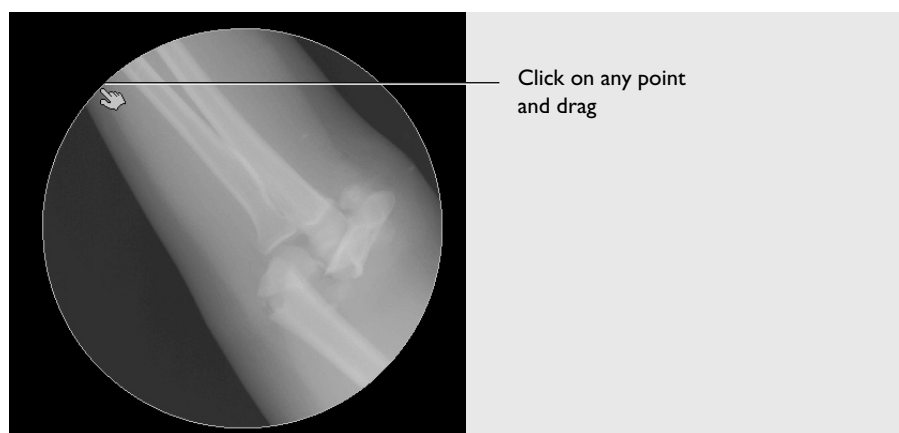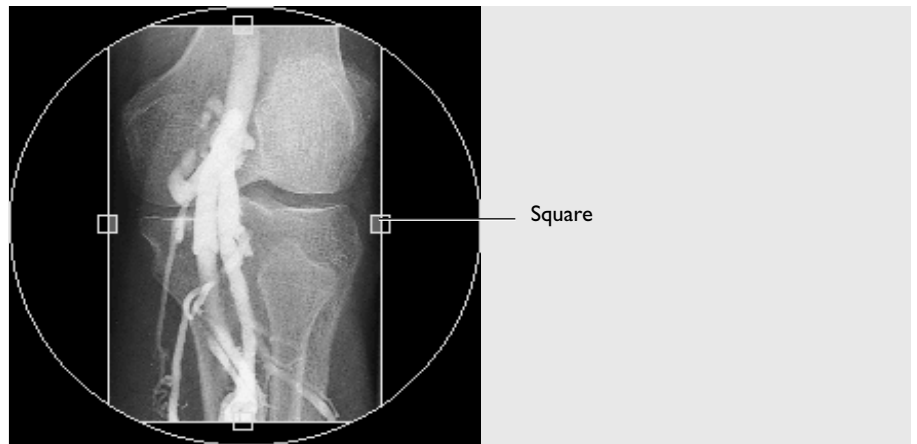
Fig. 7.6 Circular shutter

2   With the **centre** mouse button, click on the circular line to move the shutters.

Horizontal and vertical shutters

1   Using the **left** mouse button, click on a square to set one side of the shutter. Click with the **centre** mouse button to adjust both sides of the shutters symmetrically.

Square

Fig. 7.7 Combination of circular, horizontal and vertical shutters

Adjusting polygon and bezier shutters

1   Click a node of the polygon or bezier shutter and drag it into the required position.

Node

Fig. 7.8 Adjusting the polygon shutter

2   You can add or delete nodes. To create a new node, keep the 'Find' key on the left-hand side of the keyboard pressed down whilst clicking any point on the edge of the shutter. To delete existing nodes, keep the 'Find' key pressed down whilst clicking on the node to be deleted.

3   To move the shutter, click on the edge of the shutter and drag the shutter into the required position.

7.2.6   # Deleting shutters

- To delete existing shutters, click the activated shutter symbol in the 'Shutters' window or

- click the 'Reset' symbol button.
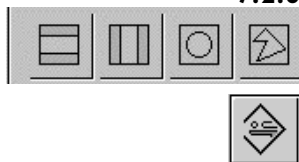
7.3   Cutting / separating images

You can use the cutting tool to cut superfluous borders off the image. The shutter function is used to defined the desired section of the image. A copy of the original image is produced during this operation. You can also use the cutting tool to separate images, where, for example, two exposures of the feet have been produced on one cassette and the images are now to be processed separately.

Cut / separate images

1   Open the editing window for the shutter function (see page 7-5).
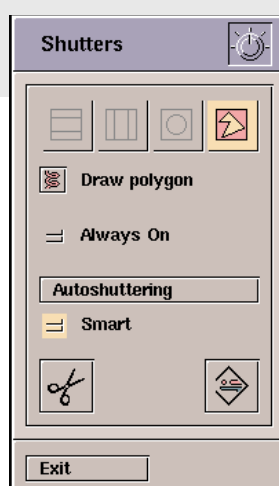
Cut / seperate images

2   Use the shutter functions in order to define the size of the borders to cut off. The areas covered by the shutters are removed.

Fig. 7.9 Cut off image borders

3   In the 'Shutters' window, click on the icon representing cutting.

A copy is created of the original image. If you wish to divide an image, repeat the procedure with a different section of the image.
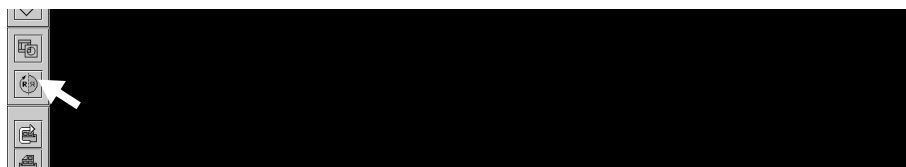
7.4   **Changing the orientation**

The image position on the EasyVision RAD workstation corresponds to the cassette position during exposure. You can subsequently change the orientation of the image by rotating and inverting.
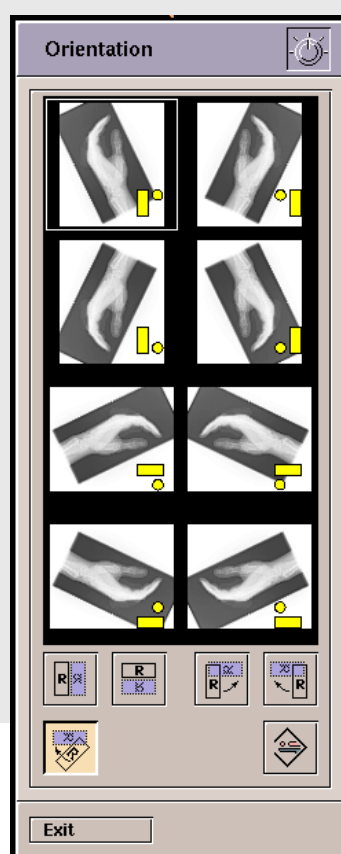
7.4.1   **Rotating and inverting images with set values**

1   Mark the image(s) on the display area (see page 4-9).

2   Click this symbol button.

- The following window appears.

	Inversion around the vertical axis (Right/left inversion)
	Inversion around the horizontal axis (top/bottom inversion)
	Rotation of 90° counterclockwise
	Rotation of 90 ° clockwise
	Rotate images freely (see page 7-12)
	Reset to original orientation
	Identification of rotation/inversion

Fig. 7.10 'Orientation' window

The framed image shows the orientation on the display area. The other images show the previews after the corresponding rotations or inversions.

3   Click on a preview or drag the white frame to a different position or use button functions to re-orientate the image.

The image on the display area is re-orientated. For identification, the symbol of the new orientation is noted on the image.

7.4.2   **Rotating images freely**

You can rotate images by a freely defined angle or orientate them to a marked reference line.

Rotating images freely

1 Mark the image on the display area.

2 Click this symbol button in the 'Orientation' window (see Fig. 7.10).
 • The following window appears.

= use points	Activate if the image should be rotated using two reference points.
[slider]	Free rotation of the image from 180° to -180°
[− 0.00 +]	Numerical rotation from 180° to -180°

Fig. 7.11 'Image Rotation' window

3 You can set the rotation freely using the slider or you can enter a numerical value to determine the exact angle of rotation. Use any value between 180° and - 180° for the numerical entry.

4 Then click the 'Apply' button.

A new image is created. This image is rotated accordingly on the display area.

**Orientating an image to a reference line**

You can orientate the image by marking two reference points which you can place in any position. The reference points are activated in the 'Measurements' window. EasyVision RAD rotates the image so that after rotation they are positioned in a perpendicular line.

1 Click this symbol button in the 'Measurements' window.

The mouse pointer shows the "set reference points mode".

2 Mark an axis via two reference points in the image which, after rotation, are to be positioned in a perpendicular line.

3 Click this symbol button in the 'Orientation' window (see Fig. 7.10).

• The following window appears
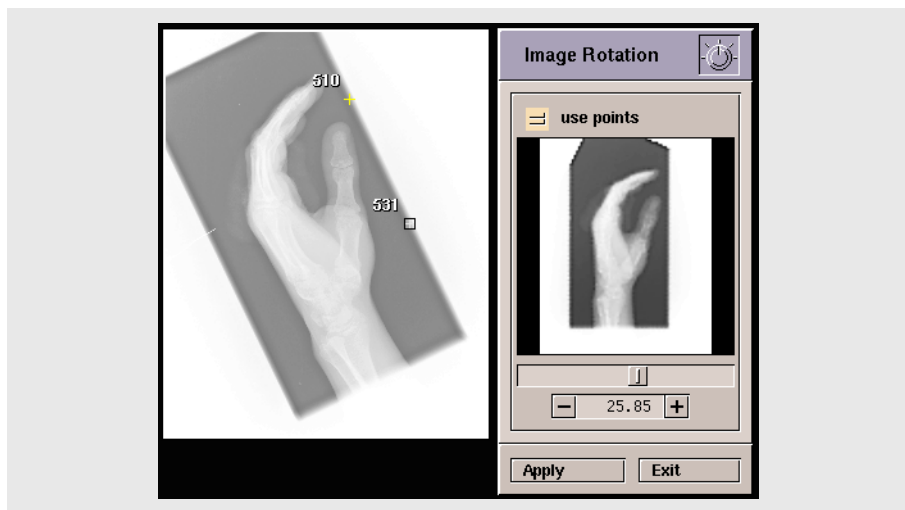
Fig. 7.12 'Image Rotation' window

A preview of the rotated image is shown in the 'Image Rotation' window. The 'use points' option is automatically activated. By deactivating the 'use points' option you can also use the slider or enter a numerical value.

4   Click the 'Apply' button.

A new image is created.

N O T E   *The newly created image is larger than the original image. In order to achieve an optimal result the new image should be edited using the polygon shutter and subsequently cut..*

7.5 Using the magnifying glass

You can observe regions of interest more precisely with the magnifying glass.

**Calling up the magnifying glass window**

1   Click this symbol button.

• A magnifying glass window appears.

Fig. 7.13 Magnifying glass window

Magnifying glass window

2   You can move the magnifying glass window across the image with the **left** mouse button depressed.

The magnifying glass operates with default settings. You can change these settings for the magnifying glass window (see page 7-14).
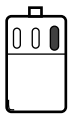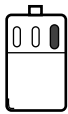
Removing the magnifying glass

1   With the **right** mouse button, click inside the magnifying glass and select 'exit'.
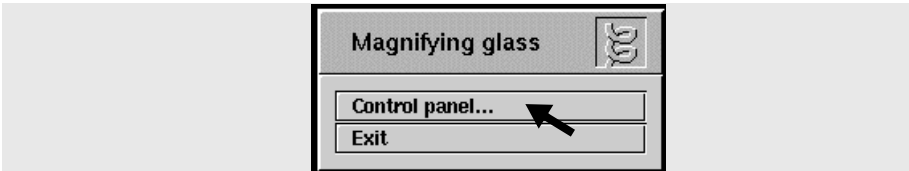

Fig. 7.14 'Magnifying glass' context menu

Changing magnifying glass settings

1   With the **right** mouse button, click within the magnifying glass window and select 'Control panel'.

• The following window appears.

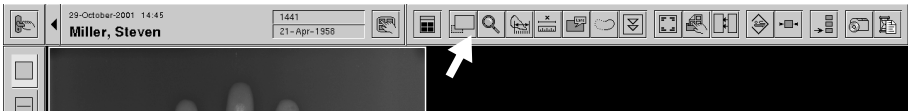|	
Magnification 3.0	*Setting the display size of the image* Confirm numeric entries with the Enter key
Size (%) 25.0	*Setting the size of the magnifying glass window* Confirm numeric entries with the Enter key
[⊞]	Increase the factors in steps
[⊟]	Reduce the factors in steps
Reset	Reset to original setting
⊐ Contrast stretch	Stretch the contrasts in the magnifying glass
Exit	Exit the function
Hide	Hide the function window, magnifying glass remains on screen

Fig. 7.15 'Magnifying glass' window

2   Select the required settings.
    • The settings are immediately applied to the magnifying glass window.

3   Click on 'Exit' or 'Hide'.

7.6   Using the zoom function

Using the zoom function, you can depict interesting image sections as an enlargement thus aiding the analysis of certain image regions.

Setting the zoom

1   Mark the image(s) on the display area (see page 4-9).

2   Click this symbol button.

Numeric zoom	Manual zoom setting
To shutters	Automatically adapt image size to shutters (see page 7-17)
Max. resolution	Show image at highest resolution (adapt pixel matrix of image and screen)
Life size	Show image at 100% scale. The term 'life size' relates to the size of the image on the image plate.
⬦	Reset to original settings
Zoom factor	Numeric entries Confirm entries with the Enter key
1 1.4 2	Select preset zoom factors
slider 4.0	Slider for stepless zoom
green frame image	*Green reference frame in the overview* Indicates which region in the display area has been enlarged. The reference frame can be moved.
Center	Centre the reference frame in the overview
⇌ **Mirror**	Mirror the position of the reference frame for the second image (see page 7-17).
Exit	Exit function, close window

Fig. 7.16 'Zoom' window

The default preset for zoom type is 'Numeric zoom'.

3   Select the zoom factor using the given setting options (slider control, numeric entry, keys).

• The following window appears.

• In the overview, a green reference frame appears as soon a zoom factor >1 has been selected.

4 Select the area to be enlarged with the help of the green reference frame in the overview.

• On the display area, the region selected with the reference frame appears enlarged.

Zooming to shutters

You can enlarge an image in such a way that it fits into the open area between the diaphragms.

Zooming to the shutters

1 In the 'Shutters' window, select a shutter type (see page 7-5).

2 In the 'Zoom' window, activate the function 'To the shutters'.

The image is enlarged in such a way that it fits into the free area of the shutters. The zoom factor is set automatically.

N O T E *When changing the shutter position, the zoom factor is automatically adapted.*
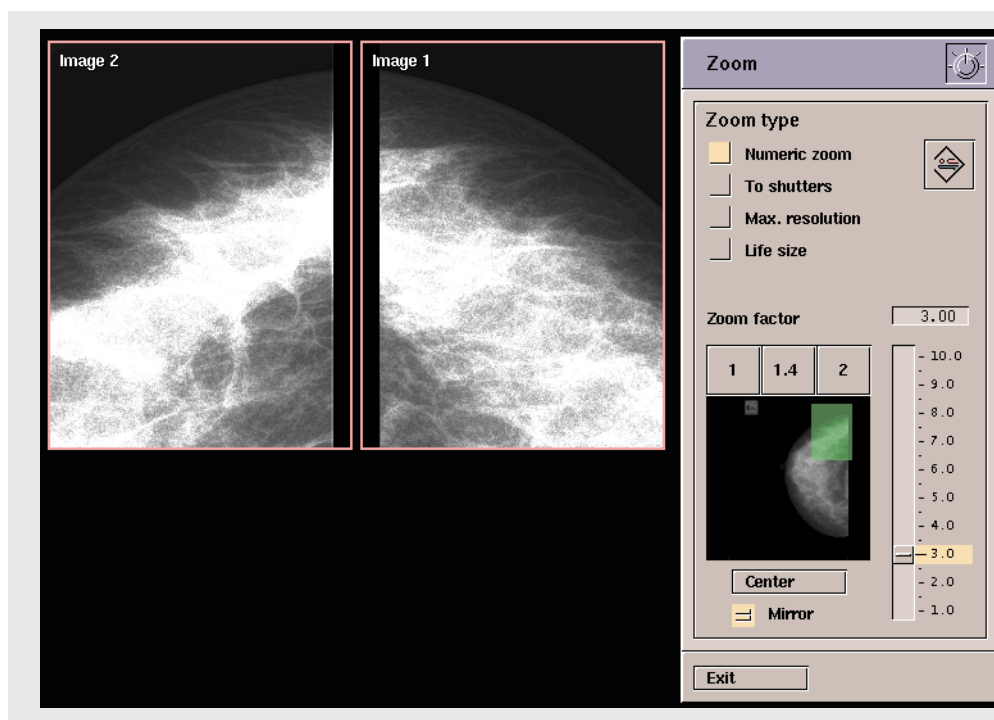
Mirroring enlargements

The mirror function can be used to enlarge image areas which are positioned opposite each in two different images. This function is, for example, particularly useful for conducting a comparative examination of the breast in the typical left right breast display.

1 Mark the two pictures on the display area (see page 4-9).

The image which was marked first is displayed in the overview in the 'Zoom' window.

2 Activate the 'Mirror' function in the 'Zoom' window.

3   Move the green reference frame in the overview to the area of interest.

Abb. 7.17 Enlargement with mirrored representation

In the display area the section of the first image contained in the green reference frame is enlarged, as is the corresponding area of the second image in the mirrored reference frame.

7.7   Calibrating images

If measurements are taken on a non-calibrated CR image, the measurement always refers to the image plate level. The results of length measurements are given in mm in relation to the image plate level. After the image has been calibrated the measurement is transferred to the calibrated object level. The measurement result in mm now refers to the calibration level. To calibrate, you require an object of a known size (ruler, catheter etc.) that is depicted on the image. Calibrated images are identified by <cal> (see page 5-30).
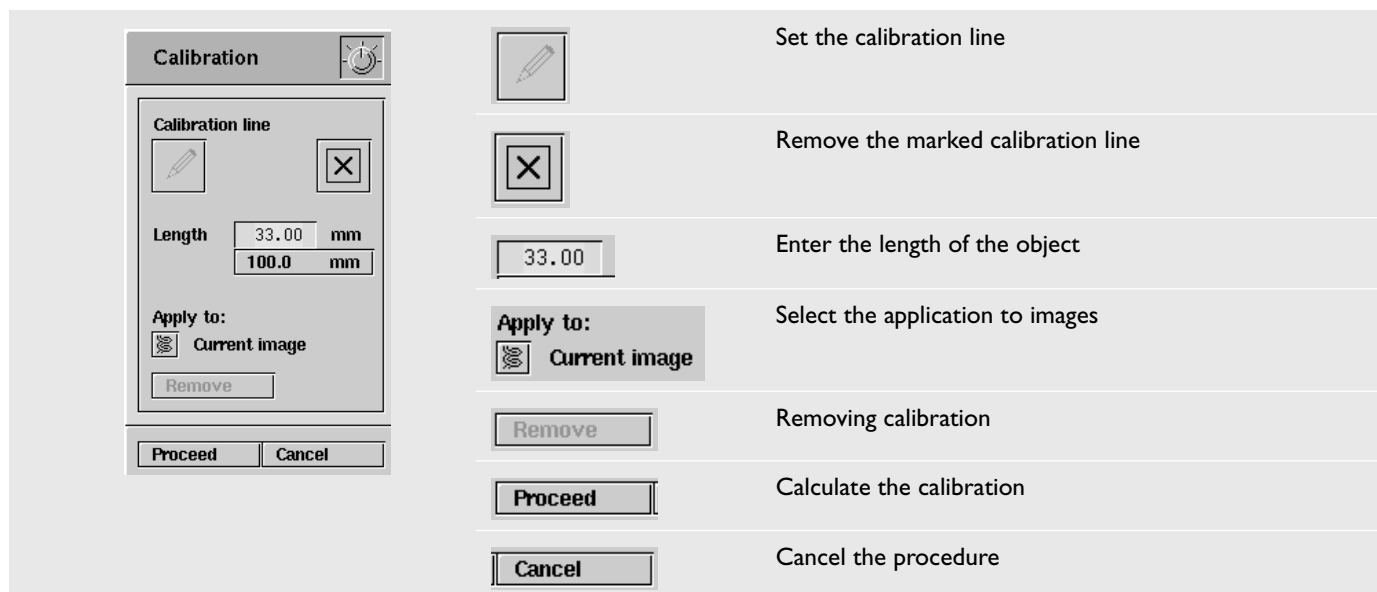
NOTE

- *The scale of the image is changed during calibration. The new scale details are displayed in the 'Image information' window (see page 5-29).*
- *You can improve the accuracy of calibration by increasing the display size of the image for small objects beforehand. The longer the calibration line, the more precise the result of calibration.*
- *Calibration data for CR images can be accessed from all EasyVision RAD workstations. It is possible that this data can not be used after the images are exported to other PACS workstations.*

Calibrating images

1   Mark the image on the display area (see page 4-9).

2   Click this symbol button.

•   The following window appears.

	Set the calibration line
	Remove the marked calibration line
33.00	Enter the length of the object
Apply to: Current image	Select the application to images
Remove	Removing calibration
Proceed	Calculate the calibration
Cancel	Cancel the procedure

Fig. 7.18 'Calibration' window

3   Click this symbol button.
•   The mouse pointer changes to a cross-hairs.

4   Click at the start of the known object of a known size and then at the end.
•   The two points are connected with a line.

You can edit the length of lines by pulling at the end points.

5   Enter the length of the object into the 'Length' field and then press the Enter key.

6   If necessary, select the examinations to be calibrated under 'Apply to'. Click on 'Proceed'.

The calibration is calculated and then saved with the image in the database. The calibration line is saved and can be edited or deleted at a later point in time.

7.8   Taking measurements

With the measuring tools, you can measure regions of interest, e.g. pixel values, distances, angles between structures. Using the analysis functions, you can determine regions and establish the grey level distribution with the help of histograms.
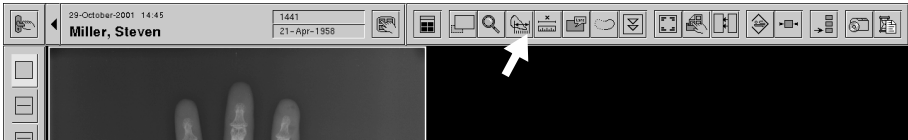
7.8.1   Point, angle and length measurements

For calibrated images, the measurement results (length measurement) appears in millimetres, for non-calibrated images in units.

Taking measurements

1   Click this symbol button.

• The following window appears.

'Measurements' group field

HHHH	*Ruler with scale (millimetres for calibrated images)* Click for the starting point, click again for the end point
+ + +	*Grey level measurement for individual pixels* Click for the first point measurement, drag for further point measurements, double-click for the last point measurement. The measurement result appears at the point. Grey levels are shown as 10-bit values from 0 to 1,023.
∕	*Angle measurement* Click 3 times in a row. The angle information appears at the angle tip, length information appears on the legs.
⊢⊣	*Distance measurement without a scale* Click for the starting point, click again for the end point
+ + +	*Rotating images and composite function* Generate reference points for image rotation (see page 7-12) and for creating composite images (see page 7-27).

Fig. 7.19 'Measurement' window

2   Select a function in the 'Measurements' group field and apply this by clicking on the display area.
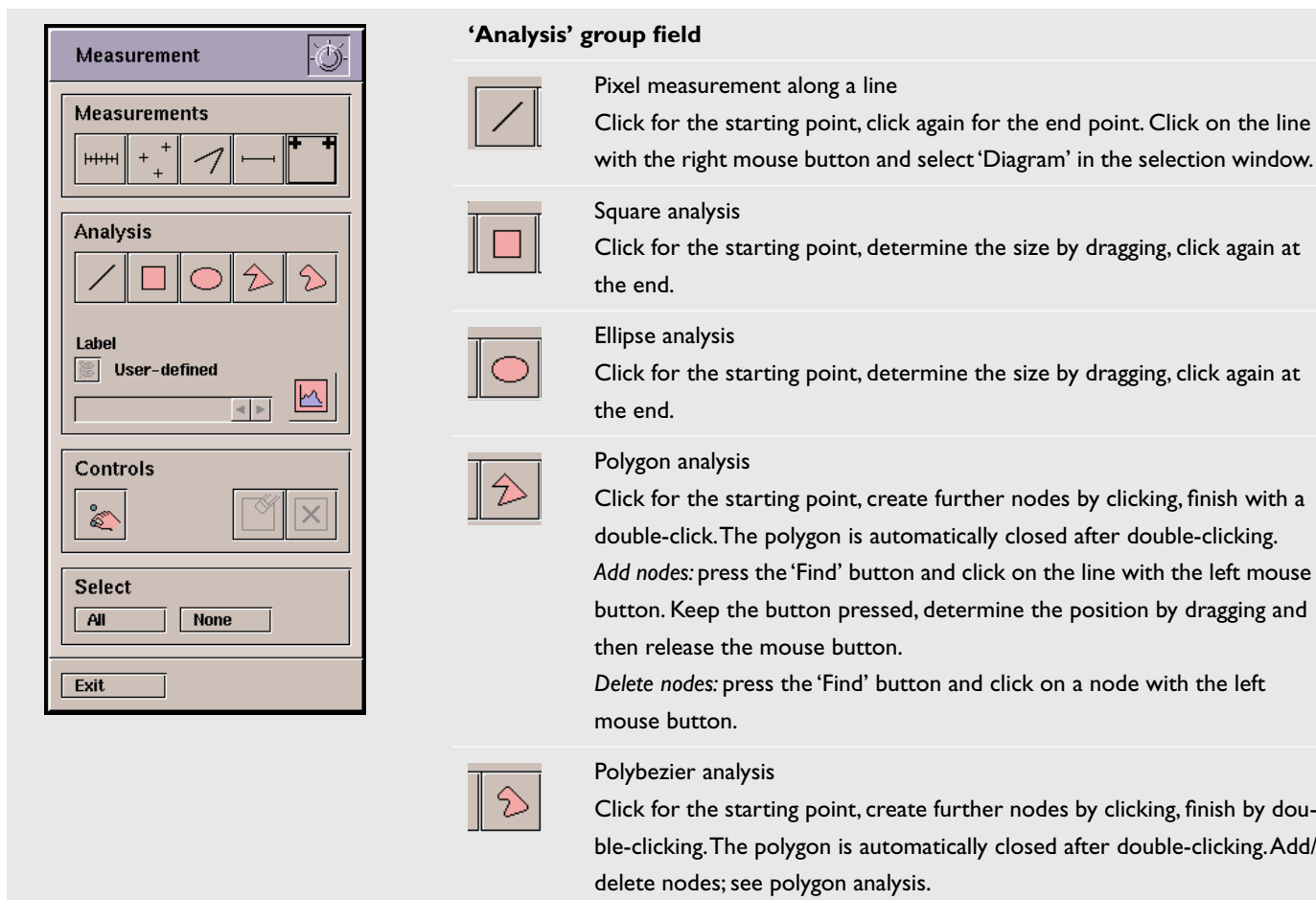
7.8.2   ## Creating analysis areas

You can examine the grey level distribution in specific regions with the help of the histogram function. To do this, an area to be analysed is established beforehand which can also be used as a **graphic object**.

Creating an analysis area

1   Open the 'Measurement' window (see page 7-20).

'Analysis' group field	
	Pixel measurement along a line Click for the starting point, click again for the end point. Click on the line with the right mouse button and select 'Diagram' in the selection window.
	Square analysis Click for the starting point, determine the size by dragging, click again at the end.
	Ellipse analysis Click for the starting point, determine the size by dragging, click again at the end.
	Polygon analysis Click for the starting point, create further nodes by clicking, finish with a double-click. The polygon is automatically closed after double-clicking. *Add nodes:* press the 'Find' button and click on the line with the left mouse button. Keep the button pressed, determine the position by dragging and then release the mouse button. *Delete nodes:* press the 'Find' button and click on a node with the left mouse button.
	Polybezier analysis Click for the starting point, create further nodes by clicking, finish by double-clicking. The polygon is automatically closed after double-clicking. Add/delete nodes; see polygon analysis.

Fig. 7.20 'Analysis' group field

2   Select a function in the 'Analysis' group field and apply this by clicking on the display area.

You can move graphic objects by dragging with the left mouse button to the required position. The characteristics of lines and areas can be edited (see page 7-41).

7.8.3   Creating histograms

Within graphic objects that you have created using the analysis tools, you can create histograms and profiles for the analysis of grey level distribution.

Creating histograms/profiles
A graphic object is shown on the display area.

1   If necessary, mark the graphic object/analysis region and click this symbol button,

'Analysis' group field

	Histogram
	If this button is clicked before creating analysis areas, a histogram is automatically produced after creation of the analysis area.
Label User-defined	Giving graphic objects a label (name) 'User-defined' = optional entry
	Display and entry field (for label) Enter a new label for a graphic object and confirm with the Enter key.
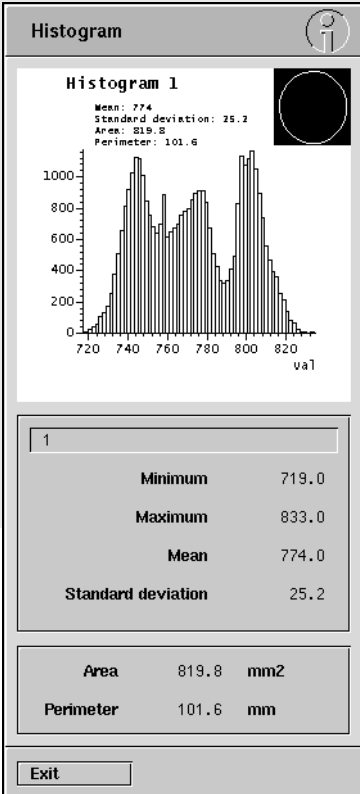
– or –

2   click on the graphic object with the **right** mouse button and select 'Diagram'.

Fig. 7.21 'Measurement' context menu

• The following window appears.

	Graphic representation of the grey level distribution
	Name of the graphic object and limit values
	Area information
Exit	Hide the histogram

Deleting histograms

1 Click again on the 'Histogram' symbol button in the 'Measurement' window,

– or –

1 click with the **right** mouse button on the histogram and select 'Delete'.
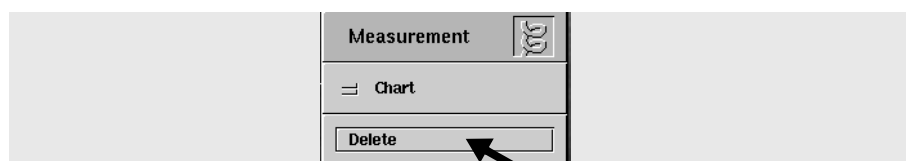
Fig. 7.22 'Measurement' context menu

7.9   # Creating a composite image

This function is a component of the optional RAD-Ortho package, and enables images that have been recorded on separate cassettes to be put together. The resulting composite images are especially suitable for an overview presentation and for measurements of the spine. However, it can also prove worthwhile to use this feature with exposures of the legs or other areas of the body that cannot be represented on a single cassette.

7.9.1   ## Basic principles behind composite images

Requirements for creating a composite image

It is essentially possible to combine any CR images originating from the same patient and based on the same pixel size (resolution).

N O T E   *This function cannot be performed on images with different pixel sizes.*

The pixel size is determined by the size of cassette used and the operating mode used for reading. CR images have a pixel size of 200 mm, 150 mm or 100 mm. The following table shows the resulting pixel sizes when images are read, and depending on the cassette size.

Matrix 'Normal' (PCR terminal>Image options>Matrix			
Cassette sizes		Matrix size	**Pixel size**
cm	inches		µm
35 cm x 43 cm	14" x 17"	1760 x 2140	**200**
35 cm x 35 cm	14" x 14"	1760 x 1760	**200**
–	10" x 12"	1670 x 2010	**150**
24 cm x 30 cm	–	1576 x 1976	**150**
	8" x 10"	2000 x 2510	**100**
18 cm x 24 cm	–	1770 x 2370	**100**
Matrix 'HQ' (high quality)			
35 cm x 43 cm	14" x 17"	3520 x 4280	**100**
35 cm x 35 cm	14" x 14"	1760 x 1760	**100**
–	10" x 12"	1670 x 2010	**100**
24 cm x 30 cm	–	1576 x 1976	**100**
	8" x 10"	2000 x 2510	**100**
18 cm x 24 cm	–	1770 x 2370	**100**

Thus, in any case all exposures prepared in the same cassette format are suitable for a composite image. Moreover, in principle all images read in HQ mode are suitable even if the cassette size is different.

To ensure that the grey shades in the exposures are displayed as similarly as possible, Philips recommends that both exposures be read in 'Fix' mode. This will result in a similar analysis of the light/dark values, whereas the display may turn out differently in 'Automatic' mode.

Both images must also be displayed in their original size in the display area of the screen. The zoom functions must therefore not be used. Where images have been enlarged previously, the settings can be reset in the zoom window.

Management of composite images

When composite images are prepared, a copy of the original image is always created. The original image is always retained in its unaltered form in the database.

The composite images that are produced are all identified in the database directory with the designation 'Run 9999' (see page 9-17).

The patient data and examination data is copied from the image that was selected first. The barcode, the S-value and the L-value of both images are deleted from the record since it is no longer possible to assign them uniquely in the composite image.

Before creating composite images

Before creating a composite image you should check and, if necessary, adjust the grey level display of the images. You can do this by using the slide controls for brightness and contrast, or you can use the functions of the corresponding processing protocol. Following this, the resulting composite image can only be altered by means of the slide controls for brightness and contrast.

Once images have been combined, the action cannot be undone. In order to repeat the operation, the original images must be called up again from the database directory.

N O T E   *If you wish to perform measurements on images of the spine, then the images must be oriented vertically before they are combined. The relevant tools cannot be used if this is not the case. Philips recommends that 'Portrait' format should already be selected on the PCR terminal.*

7.9.2   Combining images without overlaps

The method described below is suitable for producing composite images when the two exposures have no overlapping zones.

Combining images without overlaps

1   Call up the images that you would like to combine from the data directory (see page 5-12).

2   If necessary, select vertical or horizontal division of the display area and initially place the images approximately in position alongside one another or one below the other.

Fig. 7.23 Positioning the original images

The images can be combined at any point. Overlaps are adopted in the composite image as displayed; the covered section does not appear in the composite image. Equally, it is possible for a gap to be left between the images if this makes sense for anatomical reasons. Any missing areas are represented as grey in the composite image. The side edges of the images can also overlap.

3   Once both images have been roughly positioned, they should be selected using the mouse.
    • If both images are selected, the selection borders appear in light-grey (in red on a colour monitor). The selection borders may have a bothersome effect while images are being positioned. You can, if you wish, refrain from selecting the images until after they have been positioned.

4   Move the mouse (without clicking) over the image you wish to move. (When you press the cursor keys, the image that the mouse pointer is positioned over is always the one that is moved).

5   Using the cursor keys, move the image to its exact position.

<div style="text-align: right;">Philips Medical Systems December 2003</div>
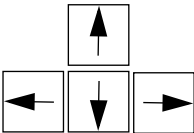
N O T E   *A superimposed straightedge facilitates the correct positioning of the image.*

6   Finally, click on this icon in the upper toolbar.
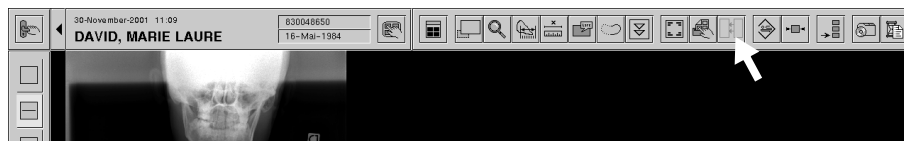
The composite image is created and stored in the same examination folder. The image is identified in the database directory with the designation 'Run 9999' (see page 9-17).

7.9.3   Stitching Images with Overlaps

EasyVision RAD provides a special stitching function for making composite images with overlapping exposures. This function has the advantage over the previously described method that no information is lost between the composite images and length measurements can be taken with precision without projecting a ruler onto the image. Corresponding exposures are, for example, created with a special long view cassette. The images produced already have markers projected onto to them allowing the exposures to be fitted together precisely.

N O T E
- *For the perfect composite function with long view cassette it is necessary to rotate the upper part of the image on the PCR terminal by 180°-. If the image is subsequently manually rotated on the EasyVision RAD, the composite function does not produce the expected result. The images are stitched next to and not on top of each other. The rotation of the upper part of the image must be controlled via allocation of the corresponding attribute in the anatomy database of the PCR terminal. If this does not occur, stitching is no longer possible and the exposure must be repeated. Further information about this can be found in the folder "PCR system>PCR terminal>Advanced User Menu".*
- *When exposing the plate ensure that the collimation extends to the margin of the cassette.*

Stitching images with the aid of magnification

1   Call up the images which you wish to stitch from the data directory (see page 5-12) and position these roughly on top of each other.

2   Open the magnification window and position the magnifying glass over the marker in the upper image.

3   Open the "Measurements" window and click on the composite function.

The mouse pointer indicates the Composite mode.

4   Position the mouse pointer exactly over the middle of the marker on the upper image and click. A cross appears on this position which can be moved later with the mouse if necessary.
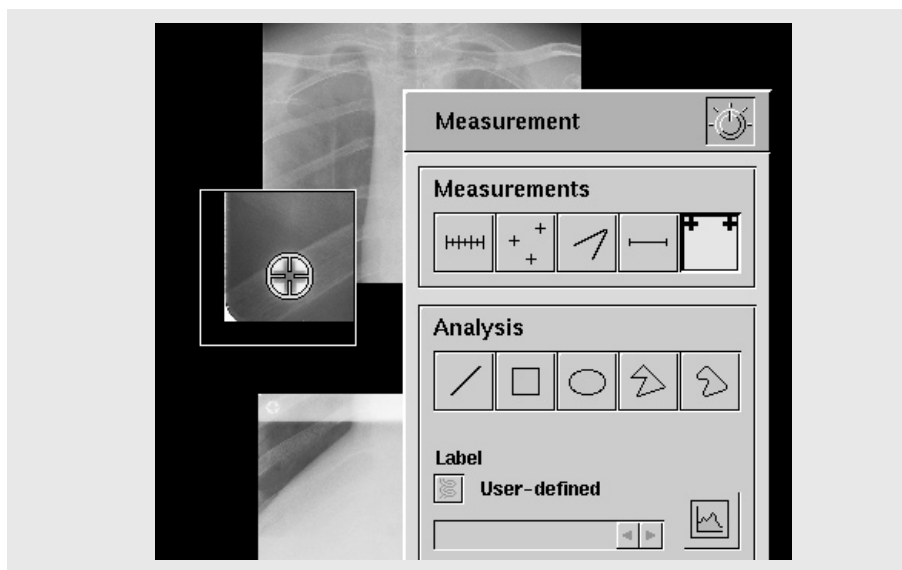
Abb. 7.24 Marker on the bottom left in the upper image

5   Position the magnifying glass over the marker in the second image.

6   Reactivate the composite function in the dimensions window and then click exactly in the middle of the illuminated marker (this is located in the overlapping zone) in the lower image.
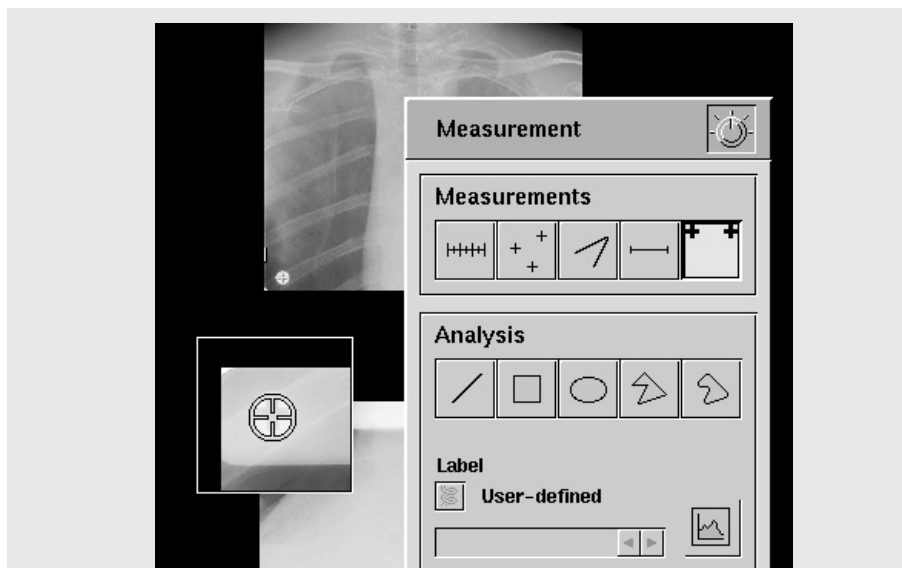
Abb. 7.25 Marker on the bottom left in the lower image

7   Now mark both images; firstly mark the upper image with the left mouse key and then click on the lower image, upon which the shadow from the image positioned above it can be seen, with the middle mouse key.

8   To stitch the images click on this symbol button in the upper tool bar.

A new composite image is created by positioning the illuminated markers exactly on top of each other. The images produced by this process are vertically aligned. In the data directory the image is labelled "Run9999" (see page 9-17).

N O T E   *The composite image created remains on the display area. The two individual images are removed from the display area (but not from the database).*
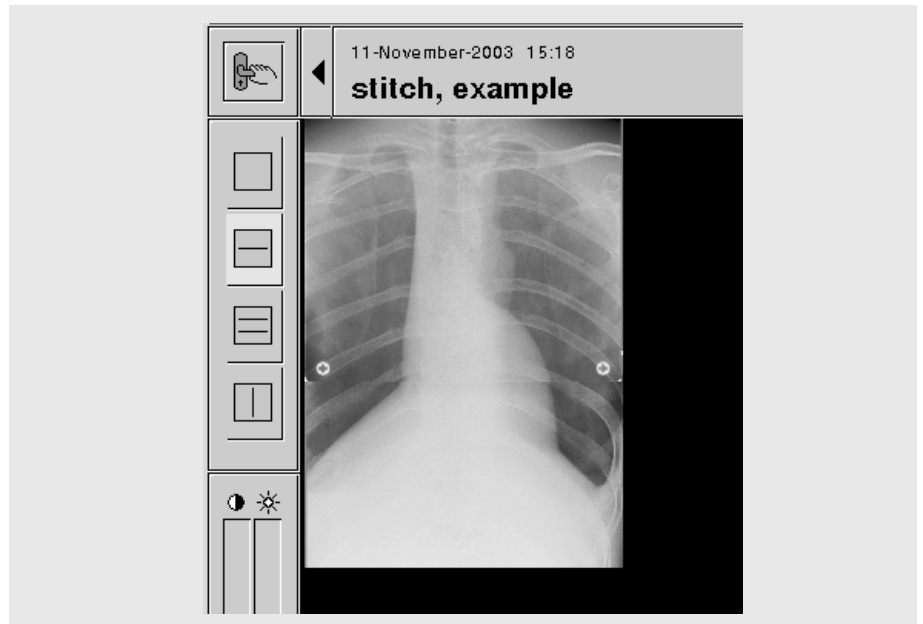
Abb. 7.26 Finished composite image

Stitching images with the aid of the zoom function

1   Call up the images that you would like to combine from the data directory (see page 5-8).

2   Mark the two images and activate the 'Max. resolution' function in the zoom tool.

3   Mark each image separately and move the reference frame in the zoom tool in the lower image to the upper, left corner and in the upper image to the lower, right corner so that the projected markers are clearly visible on the left-hand side.

4   Open the 'Measurements' window and click the composite function.

The mouse pointer shows the composite mode.

5 Position the mouse pointer exactly over the marker on the upper image and click on it. A cross appears at this point which can, if required, be moved using the mouse.
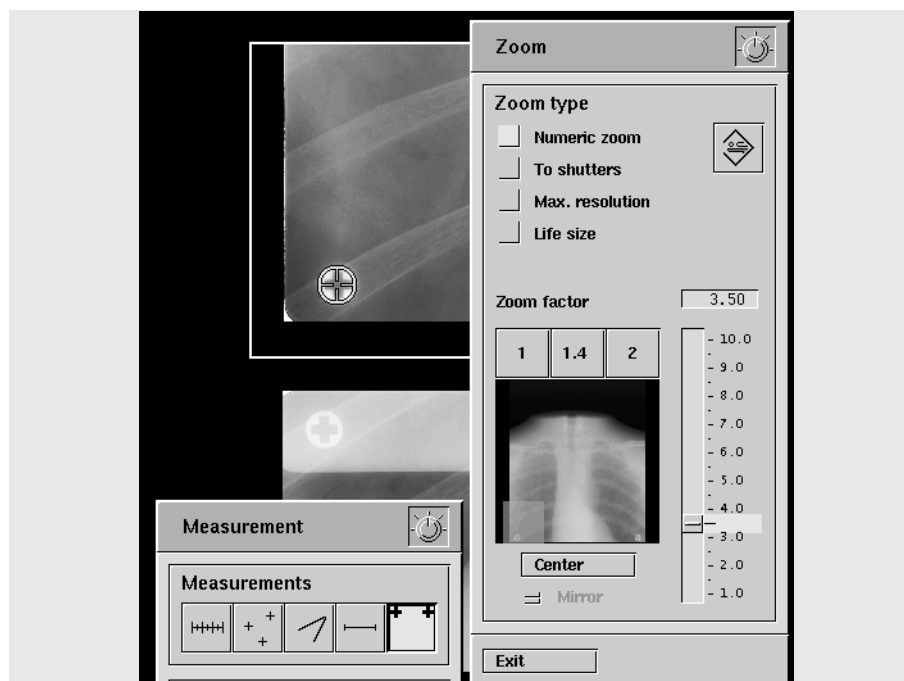
Fig. 7.27 Marker on the bottom left in the upper image

6 Reactivate the composite function in the 'Measurements' window and then click on the projected marker in the lower image. (This is located in the overlapping zone.)
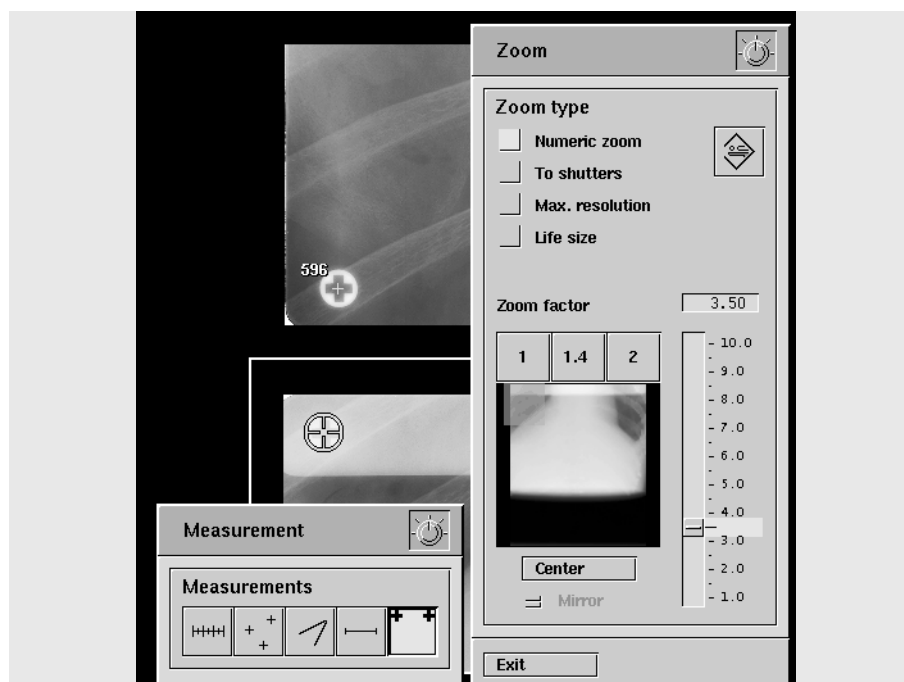
Fig. 7.28 arker on the bottom left in the lower image

7 Now mark both images, start with the upper image using the left mouse key followed by the lower image using the middle mouse key.

8 Reset the display in the zoom tool by, for example, clicking the 'Reset' symbol button in the window.

9 Then click this symbol button in the upper toolbar.

A new composite image is created in which the projected markers are exactly on top of each other. In this process the images are positioned vertically. The image is identified in the data directory with the designation 'Run 9999' (see page 9-17).
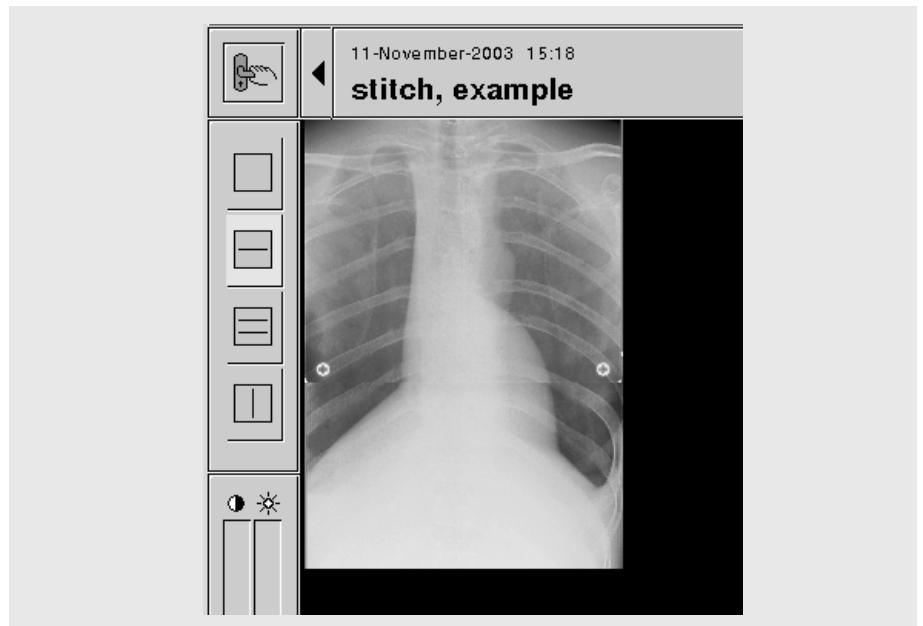
Abb. 7.29 Finished composite image

Procedure with slightly rotated images

During reading out in the plate reader in some images a slight deviation in the vertical orientation of the image (less than 0.5º) occurs. This can be seen by a white strip at the edge of the image plate or by differing widths of the overlapping areas on both sides of the image. To correct this, the picture can be automatically rotated into the correct position when it is combined. In this case the markers, instead of being on one side as described in the previous section, will now be present on both sides of the image; all four projected markers will therefore by used. Following this, the images can be recombined by clicking this symbol.

7.10 Measuring the spine `Option`

7.10.1 Basic principles behind spine measurements

The functions described in the following sections form part of the optional RAD-Ortho package for measurements on a composite image of the spine. Various measurements are involved, including those for the evaluation of scoliosis and the well-known Cobb method for determining the angle of curvature. The vertical alignment of the spine and the vertical height difference of the femoral head can also be measured, and other general measurements can also be performed.

NOTE
- *Height difference measurements that are produced in millimetres are always related to the image level at the level of the image plate.*
- *Measurements are only possible when the spine is aligned vertically. Therefore, when making the exposure you should already make sure that the spine is parallel to the longitudinal direction of the cassettes.*

Calling up the editing window

1 Click on this icon in the upper toolbar, then click on the icon for spine measurement in the selection window when it appears.
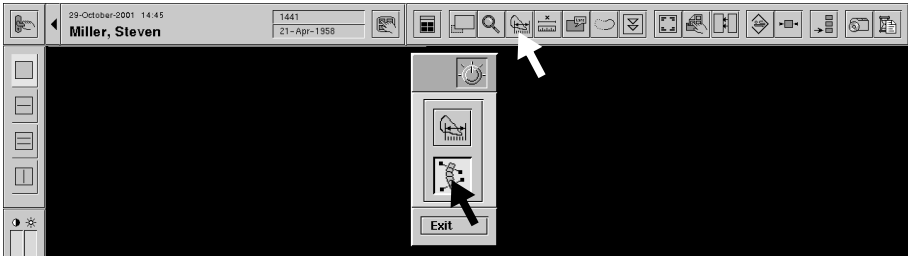
- The following editing window appears.
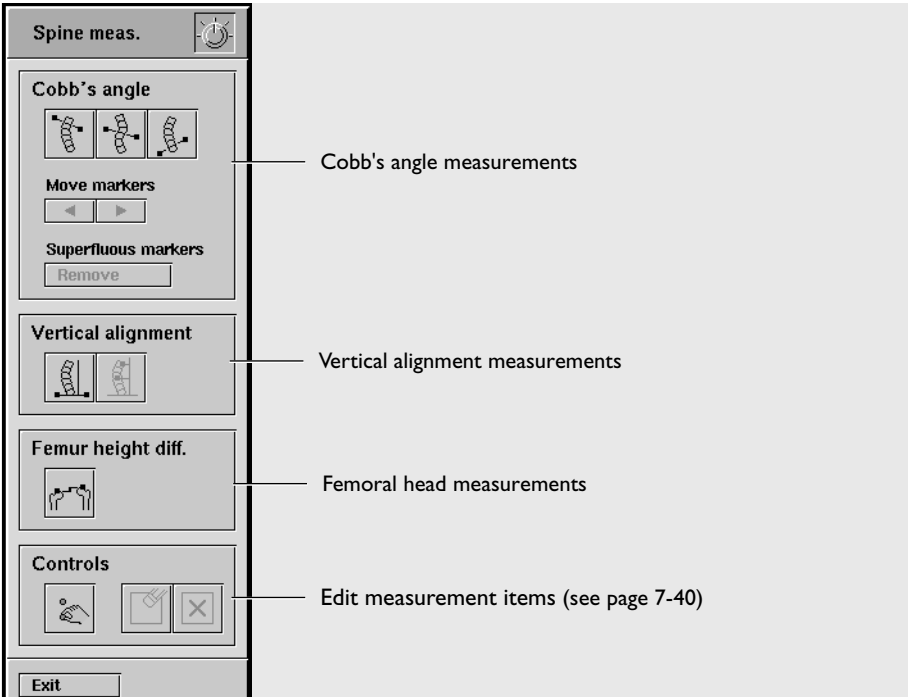
Fig. 7.30 Spine measurement window

7.10.2 Performing Cobb's angle measurements

Cobb's method can be used to analyse spinal curvature in patients with scoliosis. You can measure a single curve with two markers or a double curve with three markers.
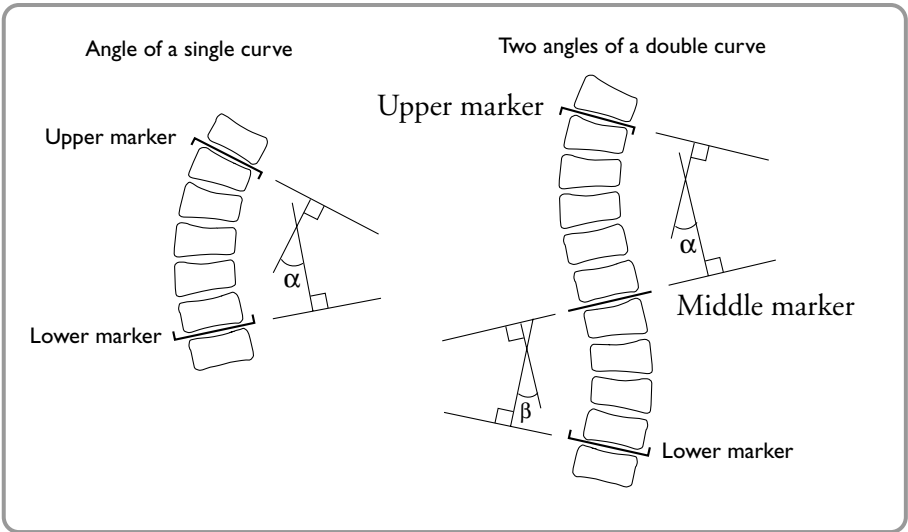
Fig. 7.31 Cobb's method

In addition to the angle measurements illustrated above - of single or double curves using two or three markers - you can combine an unlimited number of upper, middle and lower markers in order to analyse multiple curvatures.

Measuring a single curve

1 Call up the following editing window (see page 7-32).

Window	Element	Action
		Set upper marker
		Set middle marker
		Set lower marker
		Move markers
		Remove superfluous markers

Fig. 7.32 Measure Cobb's angle

2 Click on the upper marker icon.

3 Click on two points along the upper vertebral disc which exhibit the greatest angle of curvature (the start of the curvature).

4 Click on the lower marker icon.

5 Click on two points along the lower vertebral disc which exhibit the greatest angle of curvature (the end of the curvature).

Once you have placed both markers, the angle between the markers is displayed. The order described above for placing the markers on the image is not obligatory.

Measuring a double curve

1 Click on the 'Upper Marker' icon.

2 Click on two points along the upper vertebral disc which exhibit the greatest angle of curvature (the start of the curvature).

3 Click on the 'Middle Marker' icon.

4 Click on two points through the centre of the intervertebral space that exhibits the greatest angle of curvature in the middle.

5 Click on the 'Lower Marker' icon.

6 Click on two points along the lower vertebral disc which exhibit the greatest angle of curvature on the lower curve (the end of the curvature).

Once you have placed both markers, the angle between the markers is displayed. The order described above for placing the markers on the image is not obligatory.

Measuring multiple curvatures

If you wish to measure more than two Cobb's angles, you may combine an unlimited number of upper, middle and lower markers.

Searching for the largest angle

The point at which the greatest angle occurs is not always immediately apparent. If this is the case, you can add more than one marker of the same type, e.g. an additional upper marker close to the first one. The same principle applies to middle and lower markers.

In the case of a double curve measurement, the angle value displayed is the greatest value between the upper/lower markers and the middle markers. The markers with lower values should now be removed. In the case of a single curve measurement, the value indicates the angle between the upper and lower markers.

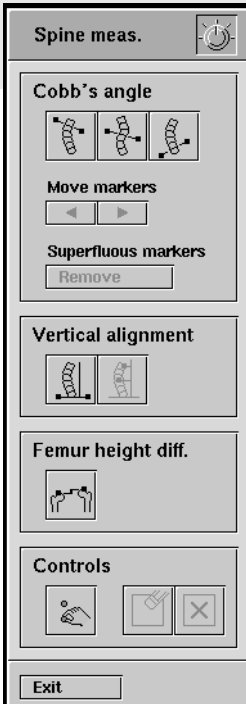Philips Medical Systems December 2003

Editing markers

The annotations containing the angle values can cover up important anatomical details.

1   In this case, drag the annotation to the left or right.

The annotation can only be dragged horizontally; vertically it remains anchored to the level of the marker.
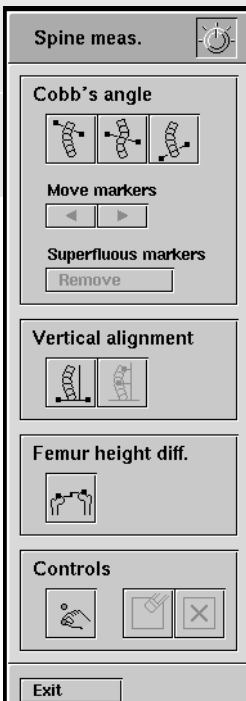
NOTE   *The Cobb's angle markers are treated as a single measurement object. If 'Remove' is clicked, all the markers are always removed.*

7.10.3   Measuring the vertical alignment

1   Call up the following editing window (see page 7-32).

Window	Element	Action
Spine meas. / Cobb's angle / Move markers / Superfluous markers / Remove		Create reference lines
Vertical alignment / Femur height diff. / Controls / Exit		Measure vertical alignment

Fig. 7.33 Measure vertical alignment

2   Click on the icon for creating the reference line.
    • The mouse pointer appears as a cross-hairs.

3   Click on the two reference points, i.e. on the two upper points of the left and right sacroiliac joint.
    • A horizontal line is displayed connecting these two points. A vertical reference line appears at the central point of the connecting line.

4   Click on the icon for measuring the alignment.
    • The mouse pointer appears as a cross-hairs.

5   Click on points to the left and right of the spine at which you wish to measure the lateral displacement.
    • A horizontal line appears along with the distance from the vertical reference line.

You can measure more than one lateral offset by repeating the last two steps.

Deleting the offset line

1   Drag the handle of the offset line to the reference line until the offset annotation displays 0 mm.

Moving annotations

The annotation containing the offset value can cover up important anatomical details.

In this case, drag the annotation to the left or right.

The annotation can only be dragged horizontally; vertically it remains anchored to the level of the marker.

7.10.4   Measuring height difference of femoral head

1   Call up the following editing window (see page 7-32).

Window	Element	Action
Spine meas. ⏻		Measure height difference

Fig. 7.34 Measure height difference of femoral head

1   Click on the button for measuring height difference.
  • The mouse pointer appears as a cross-hairs.

2   Click on two points, one at the top of the left femoral head and one at the top of the right femoral head.
  • A horizontal line between these two points appears.

If there is a height difference, then the horizontal line is divided into two sections joined by a vertical line. The height difference is displayed in the middle.
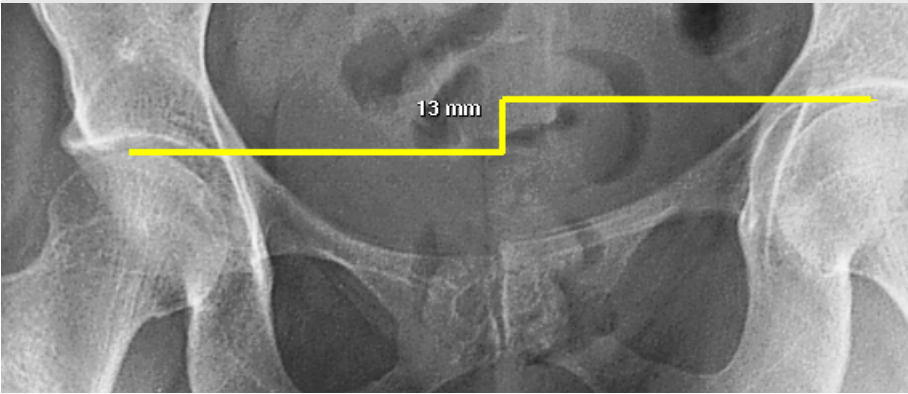
Fig. 7.35 The height difference between the femoral heads is displayed

7.11   Creating annotations

You can add localisations or special instructions with the help of default annotations.

7.11.1   Assigning default annotations

Default annotations are predefined annotations which are frequently used. They can be positioned on the display area via a context menu.
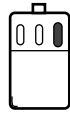
Assigning default annotations

1 With the **right** mouse button, click on the display area.
   • A context menu appears.

User-defined
default annotations
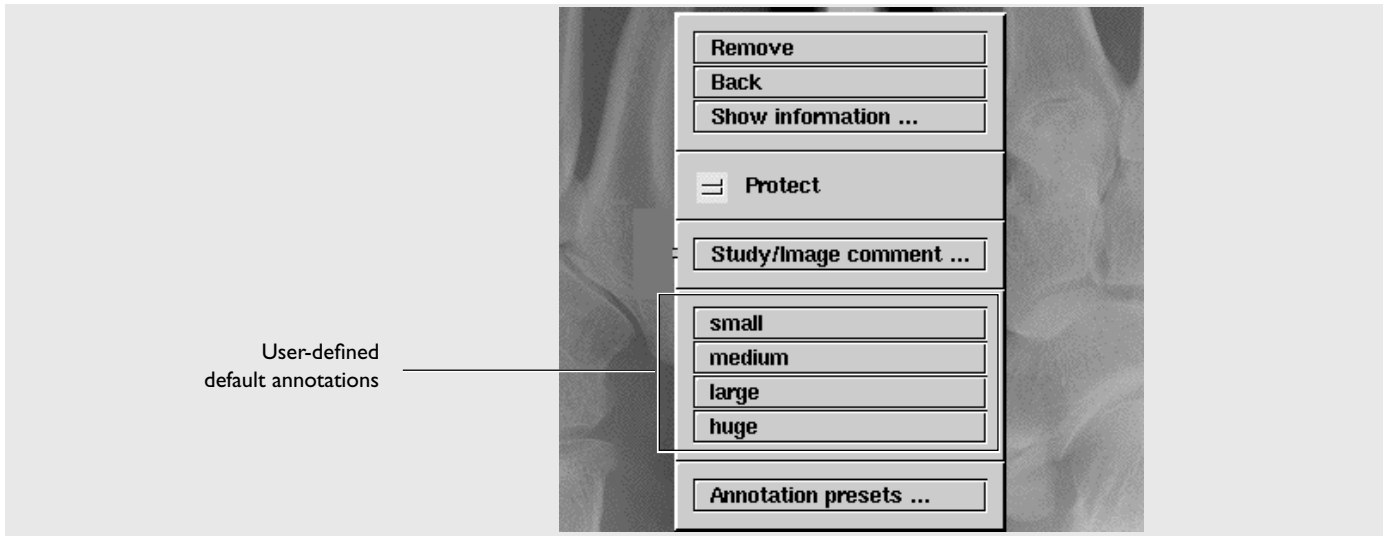
Fig. 7.36 Context menu

2 Select the required annotation.

The annotation is placed on the image.

7.11.2   # Editing default annotations

You can produce new default annotations which then appear in the context menu or edit the available default annotations.
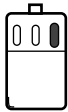
Editing default annotations

1   With the **right** mouse button, click on the display area.
    • The context menu appears (see Fig. 7.36).

2   Select 'Annotation presets'.
    • The following window appears.

Edit		Edit marked default annotation
Delete		Delete marked default annotation
Delete all ...		Delete all default annotations
Confirm		Confirm entry of a new annotation
Cancel		Delete entered text
No. 5		A new number is automatically assigned: the default annotations are sorted numerically in the context menu.
Size 🗒 **Small**		Select a font size
Exit		Cancel all new entries
Save		Save new entries

Fig. 7.37 'Annotation presets' window

3   If you would like to edit an existing default annotation, mark it and click on 'Edit'. If you would like to create a new default annotation, start with the text entry.

4   Enter the new text in the entry field under 'Text', and select the required font size.

5 When you create a new default annotation, a new number is automatically generated.

When you create a new default annotation, a new number is automatically generated.

6 Click on 'Save' to save the new entries.

The default annotations appear in the context menu in the order of their numbers.

7.11.3   Creating customised annotations

You can create annotations for special instructions.

Creating annotations

1 Click this symbol button.

• The following window appears.

	'Annotations' group field
	Create arrows (click twice)
	Create annotations without arrow (click once)
	Create annotations with an arrow (click twice)

Fig. 7.38 'Annotate' window

2 In the 'Annotations' group field, select a function.
• The mouse pointer changes to cross-hairs.

3 Create an annotation by clicking on the display area and edit the text in the entry field.

You can move the annotations by dragging on the display area and editing various characteristics (see page 7-41).

7.12   Editing objects

7.12.1   Marking objects

If you would like to edit graphic objects or annotations, you must first mark them. For further information on this topic refer to the section „Selecting in the display area" on page 4-9.

Marking/unmarking everything

1   Use the functions in the 'Select' group field in the 'Measurement' or 'Annotate' windows in order to mark/unmark all objects.
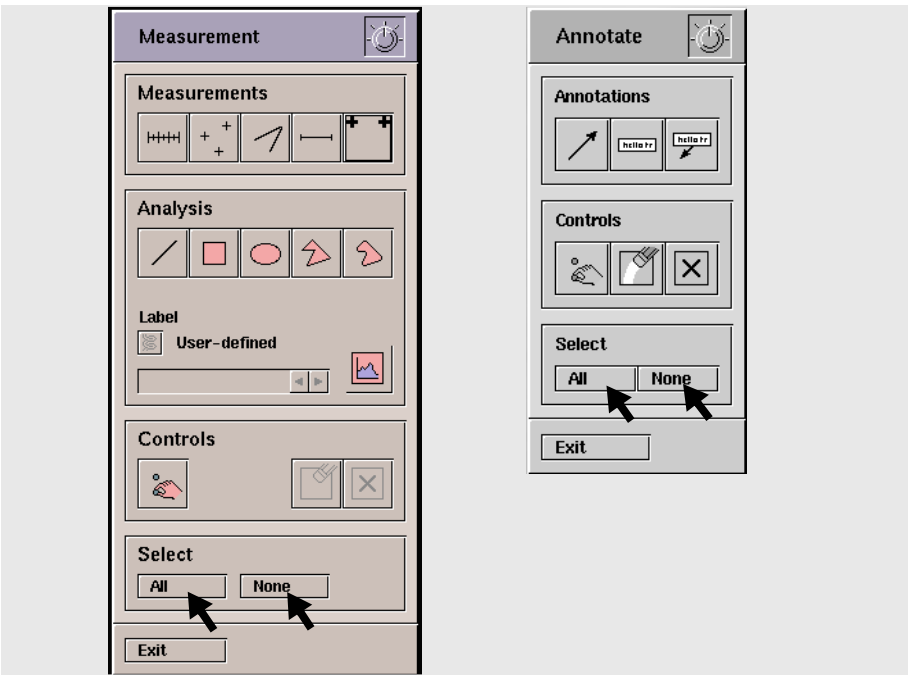
Fig. 7.39 'Select' group field

7.12.2   Deleting objects

1   Mark the graphic objects and click this symbol button in the 'Measurement' or 'Annotate' windows,

– or –

1   click with the **right** mouse button on a graphic object and select 'Delete' in the context menu.
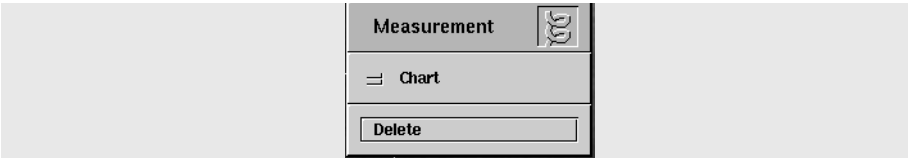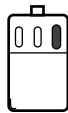
Fig. 7.40 'Measurement' context menu

7.12.3 Editing characteristics of graphic objects

You can edit the graphic objects which you have created with the help of analysis functions in the 'Measurement' window.

Changing characteristics

1   If necessary, mark the graphic object on the display area.

2   Click this symbol button in the 'Measurement' window (see Fig. 7.19).
    • The following window appears.
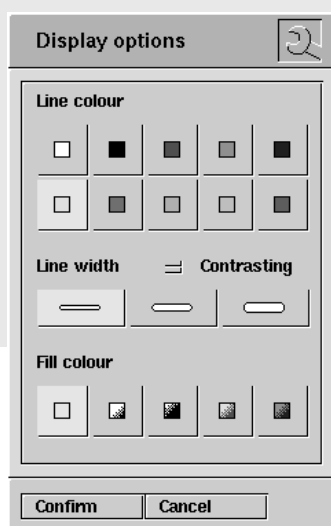
Line colour	Determine the line colour
Line width	Determine the line thickness
Fill colour	Determine the fill colour
Confirm	Apply settings
Cancel	Cancel procedure

Fig. 7.41 'Display options' window

3   Select the required characteristics and confirm your choice.

The marked graphic object is changed accordingly.

7.12.4 Editing characteristics of annotations

You can edit the line and area attributes of placed annotations.

Changing characteristics

1   If necessary, mark the annotation on the display area.

1   Click this symbol button in the 'Annotate' window.
    • The following window appears.
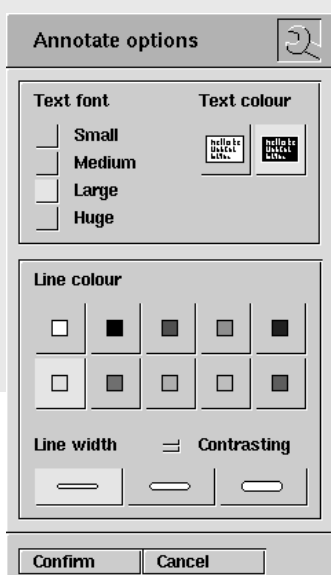
Text font	Determine text attributes
Line colour	Determine line colour
Line width	Determine line thickness
Contrasting	Increase line contrast
Confirm	Apply settings
Cancel	Cancel procedure

Fig. 7.42 'Annotate options' window

2   Select the required options and confirm your choice.

Marked annotations are changed accordingly.

Chapter 8 Image output on print media 8-3

8 Image output on print media

NOTE   *In the PCR application, only system-internal images can be printed properly (see page 5-4).*

This chapter describes the functions for image output on film or paper. You will learn, among other things, how to print out images using print protocols or in free format.

Fig. 8.1 'Printing using protocols' window

8.1   Various printing methods

8.1.1   Automatic printing `Option`

For image output, it is first necessary to distinguish between automatic and manual printing. Automatic printing is effected by cassette processing at the PCR terminal and is based on settings which were determined during installation of the PCR system. No operator action at the EasyVision RAD workstation is required.

8.1.2   Manual printing

Manual printing describes the process in which the user starts a print job from the EasyVision RAD workstation. This chapter describes the main points of manual printing.

Manual printing using print protocols `Option`

Print protocols determine the arrangement and composition of other elements on the film such as film annotation, scales, etc. You can change the preset print protocols or add new, user-defined print protocols.

Fig. 8.2 Printing using print protocols

Manual printing with a free layout

For image output, you can use the print form which permits free placement of images, text fields and graphic objects.

Fig. 8.3 Printing with free film composition

Printing the entire examination

With this function you can start the print job manually after viewing and print out the images in the same way as automatic printing from the PCR terminal.

Fig. 8.4 Printing the entire examination

8.2   Printing the entire examination

This function allows easy and rapid film output after viewing the images, without having to make any further settings. The images called up are printed in the same way as automatic printing from the PCR terminal (according to the settings from the anatomy database in the service menu of the PCR terminal). The 'Print entire examination' function, however, can only be used for images from the local EasyVision database which have been transferred from the PCR image reader connected. With PCR images which have been imported from other systems and in the case of sent images this function cannot be performed.

NOTE   *The marking functions in the display area do not have any effect. All the images shown in the display area will always be printed out (also ones in the virtual display area or in the optional Navigator).*

Printing entire examination

1   Call up the required images from the local database (see page 5-8).

2   Edit the images if necessary.

3   Click on this symbol in the side function bar.
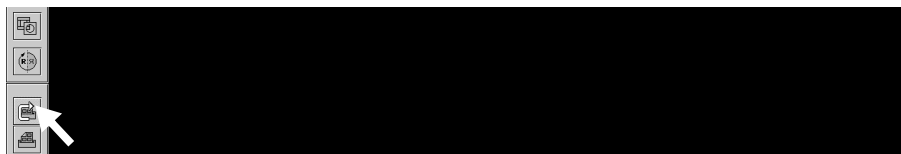
• A confirmation appears.

All the images displayed are printed. The print job is processed in the background. You can check the status of this print job and of other print jobs with the help of the status function. For further information on this topic refer to the section „Monitoring of processing procedures" on page 10-5.

8.3 Printing with a free layout

You can combine images, graphic objects and text fields with one another on a flexible layout and output this on film or paper media. The size of the individual elements can be freely set. The entire display area is used to accept images into the print preview. You should therefore prepare all the images and graphic objects such as histograms in the display area.

*Printing with a free layout*

1 Click this symbol button.

• The following window appears.

Symbol	Description
	Print preview with layout grid
	White frame for accepting images, graphic objects and text fields in the print preview.
◄ ►	Generate new pages and page forwards and backwards
	Delete contents of a marked frame
	Delete displayed page
	Delete all pages
	Generate text fields
	Determine layout grid
Printer Medium	Select printer and print medium
	Send off print job
Exit	Hide window
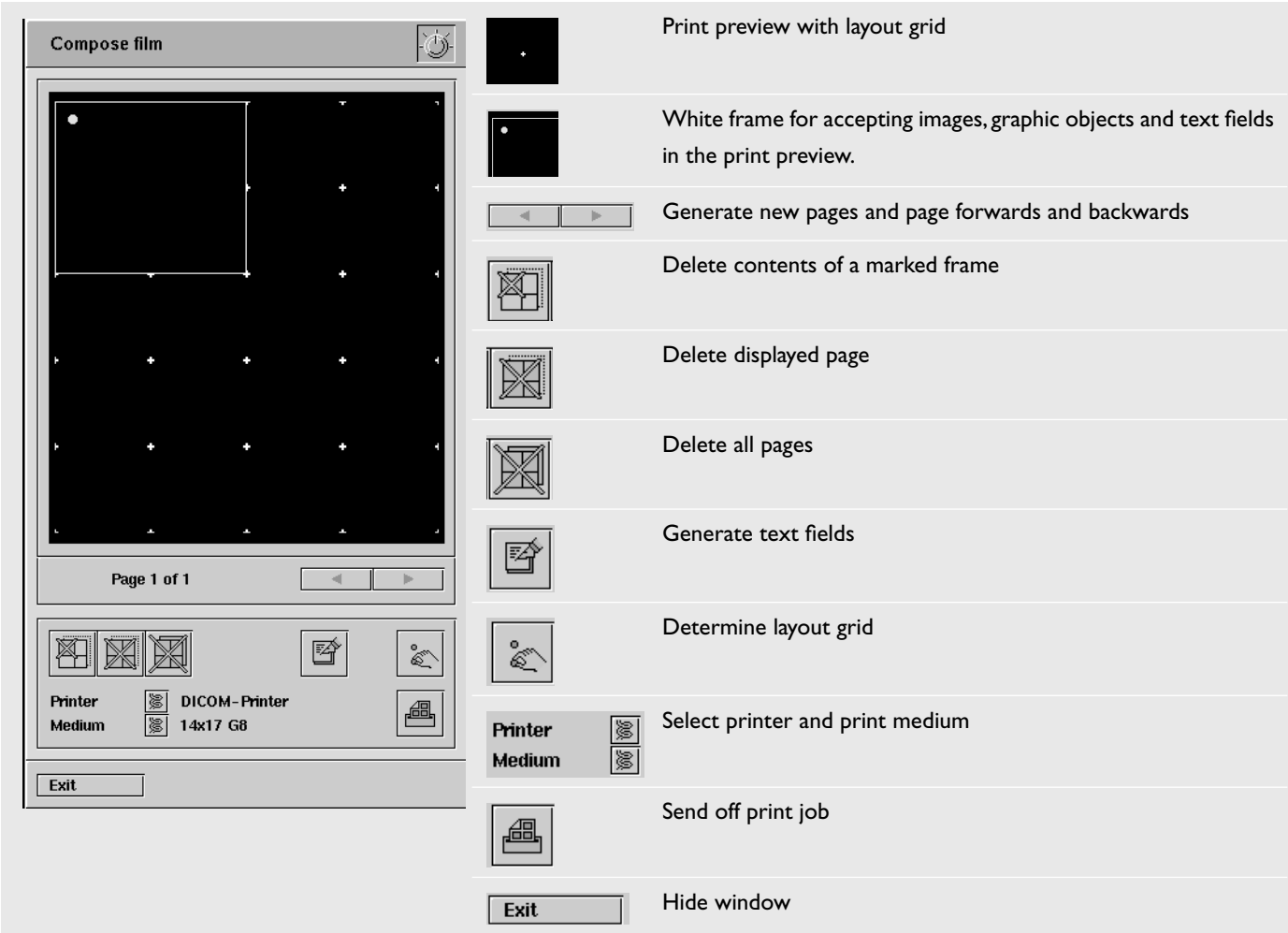
Fig. 8.5 'Compose film' window

In the print preview, a white frame automatically appears to accept an image if the 'Select automatically' function has been activated (see page 8-10). If this function is deactivated, a new frame is created by clicking in the print preview. A point then appears at the mouse pointer which identifies the 'Load image' mode.

2 In the display area or in the 'Navigation' window click on the image required or on the histogram.
  • The image is loaded into the white frame.
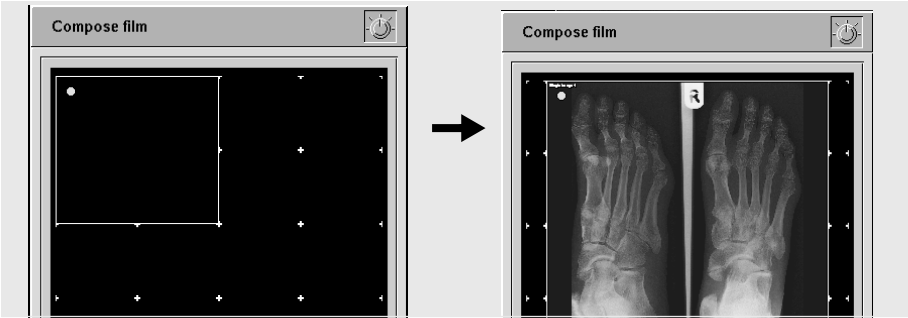
Fig. 8.6 Image acquisition in the print preview

The size of the image can be changed by dragging the margin of the white frame. Moving the frame is possible by clicking, for example in the centre of the image, and dragging to a free position. Another image can be loaded into the frame by marking the frame and then clicking on another image on the display area or in the 'Navigation'.

3 If necessary, create a new page by clicking on the arrow button.

4 Finally select the printer and medium, and click this symbol button to send off the print job.

The print job is processed in the background. You can check the status of this print job and of other print jobs with the help of the status function. For further information on this topic refer to the section „Monitoring of processing procedures" on page 10-5.

Insert text fields

You can insert a text field with comments into the print preview.

Inserting text fields

1 If necessary, create a new white frame to accept a text field in the 'Compose film' window by clicking in the print preview.

2 In the 'Compose film' window, click this symbol button.

• The following window appears.
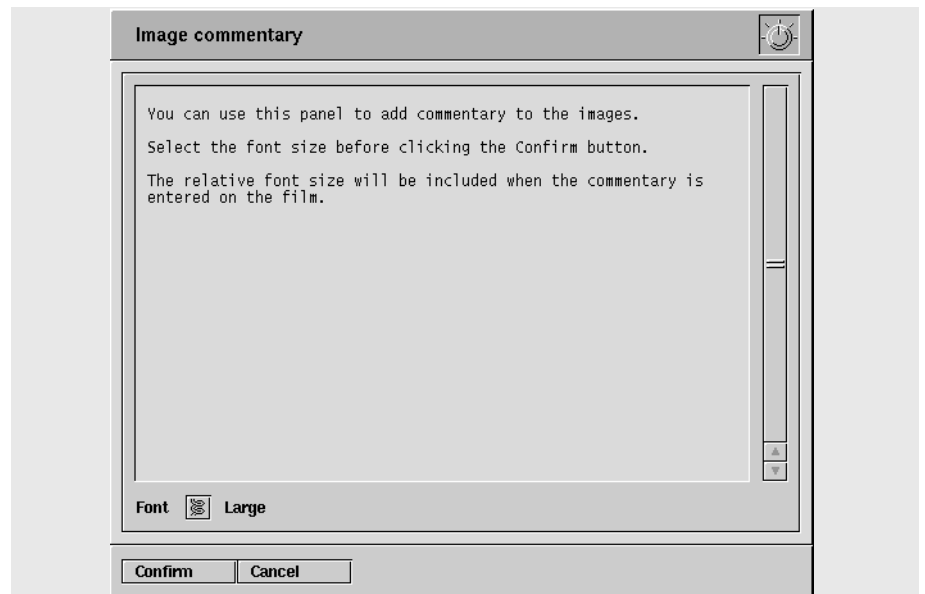
Fig. 8.7 'Image commentary'

3 Edit the text and, if necessary, select the required font size.

4 Click 'Confirm'.
• The text field is loaded into the white frame.

You can edit a text field that has already been loaded into a frame by marking it and then clicking this symbol button.

8.3.2 Creating a layout grid

You can create a grid marked with white crosses in the print preview.

Creating a layout grid

1 In the 'Compose film' window, click this symbol button.

• The following window appears.

Copies `1`	Set the number of copies
Cubic	Select the interpolation method
Rush	Place the next print job in the first position in the queue
Portrait	Select the format of the film
`5` **–** **+**	Set the number of lines and columns in the layout
Horizontal	Set the filling order (see page 8-24)
Select automatically	By activating this option, a new frame is automatically created after one has been filled.
Confirm	Apply settings
Cancel	Cancel procedure

Fig. 8.8 'Compose film' window

2 Select the required settings and click 'Confirm'.

8.4 Print protocols

The print protocols installed on your EasyVision RAD workstation are matched to the special requirements of different image types. For every application, there are specific print protocols for an optimum output of the respective image type.

8.4.1 Standard print protocols

The PCR application contains a series of default print protocols which can be used for the documentation of images from various modalities. They are based on different document types in which fundamental layout features are established, such as format position, arrangement of the film annotation, etc. With the help of these basic settings, you can create your own print protocols in the 'PCR print format editor'. For further information on this topic refer to the section „Overriding print protocols" on page 8-22.
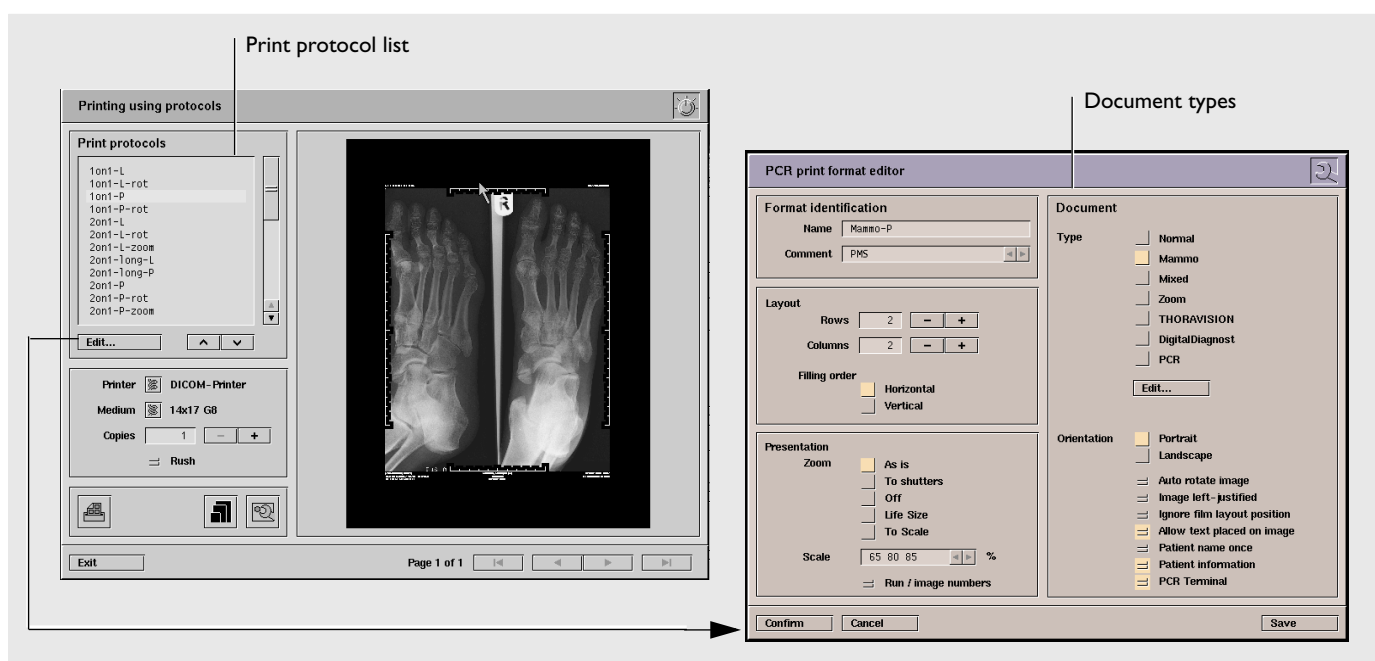
Fig. 8.9 Print protocols and editor

The table on the next page shows the various document types and the PCR print protocols based on these with the preset values.

NOTE *For installation, the print protocols are adapted by Philips Customer Service in accordance with customer specifications. Therefore the number, names and settings of print protocols may differ from those shown here.*

Standard print protocol overview

	PCR print protocol	Document type	Com-ment	Orienta-tion	Auto rotate	Image left	Ignore position	Allow text on image
CR images	1on1-L	'Normal'	PMS	Landscape	Off	Off	Off	Off
	1on1-L-rot		PMS	Landscape	On	Off	Off	Off
	1on1-P		PMS	Portrait	Off	Off	Off	Off
	1on1-P-rot		PMS	Portrait	On	Off	Off	Off
	2on1-L		PMS	Landscape	Off	Off	Off	Off
	2on1-L-rot		PMS	Landscape	On	Off	Off	Off
	2on1-L-zoom	Zoom	PMS	Landscape	Off	Off	Off	Off
	2on1-P	Normal	PMS	Portrait	Off	Off	Off	Off
	2on1-P-rot		PMS	Portrait	On	Off	Off	Off
	2on1-P-zoom	Zoom	PMS	Portrait	Off	Off	Off	Off
	2on1-long-P	Normal	PMS	Portrait	Off	Off	Off	Off
	2on1-long-L		PMS	Landscape	Off	Off	Off	Off
	Spine-P		PMS	Portrait	Off	Off	Off	Off
	Mixed-L	'Mixed'	PMS	Landscape	Off	Off	Off	Off
	Mammo-P	'Mammo'	PMS	Portrait	Off	Off	Off	On
	Mammo-P-rot		PMS	Portrait	On	Off	Off	On
	Mammo-1on1		PMS	Portrait	Off	Off	Off	On
	Mammo-1on1-L		PMS	Portrait	Off	On	On	On
	Mammo-1on1-R		PMS	Portrait	Off	Off	Off	On
	THORAVISION-L	'THORAVISION'	PMS	Landscape	On	Off	Off	On
	THORAVISION-P		PMS	Portrait	On	Off	Off	On
	THORAVISION-2L		PMS	Landscape	On	Off	Off	On
	DD-2on1-cp-L-I*	'DigitalDiagnost'	PMS	Landscape	Off	Off	Off	On
	DD-2on1-lg-P-O*		PMS	Portrait	Off	Off	Off	Off

Explanations

1on1, 2on1, 4on1	One image per film, two images per film, four images per film
comp, cp	Horizontal subdivision of the film format, (compact)
long, lg	Vertical subdivision of the film format
P, L	Portrait, Landscape
rot	Autorotation activated (see page 8-22)
zoom	Print protocol for displaying an enlarged image section (see page 8-16)
DD*	Example of print protocols for Digital Diagnost images: There are approx. 20 default print protocols in total for Digital Diagnost.
I	Labelling on the image (in)
O	Labelling outside the image (out)

PCR print protocol	Patient information	Rows	Col- umns	Filling order	Zoom	Image numbers	Scale (%)
1on1-L	On	1	1	Horizontal	As is	Off	67, 90, 100
1on1-L-rot	On	1	1	Horizontal	As is	Off	67, 90, 100
1on1-P	On	1	1	Horizontal	As is	Off	67, 90, 100
1on1-P-rot	On	1	1	Horizontal	As is	Off	67, 90, 100
2on1-L	On	1	2	Horizontal	As is	Off	44, 50, 65, 80, 85, 100
2on1-L-rot	On	1	2	Horizontal	As is	Off	44, 50, 65, 80, 85, 100
2on1-L-zoom	On	1	2	Horizontal	As is	Off	–
2on1-P	On	1	2	Horizontal	As is	Off	48, 57, 75, 100
2on1-P-rot	On	1	2	Horizontal	As is	Off	48, 57, 75, 100
2on1-P-zoom	On	2	1	Horizontal	As is	Off	–
2on1-long-P	On	1	2	Horizontal	As is	Off	44, 50, 65, 80, 85, 100
2on1-long-L	On	2	1	Horizontal	As is	Off	44, 67, 75, 100
Spine-P	On	1	2	Horizontal	Life size	Off	–
Mixed-L	On	1	2	Horizontal	As is	Off	–
Mammo-P	On	2	2	Horizontal	As is	Off	65, 80, 85
Mammo-P-rot	On	2	2	Horizontal	As is	Off	65, 80, 85
Mammo-1on1	On	1	1	Horizontal	As is	Off	–
Mammo-1on1-L	On	1	1	Horizontal	As is	Off	–
Mammo-1on1-R	On	1	1	Horizontal	As is	Off	–
THORAVISION-L	On	1	1	Horizontal	As is	Off	–
THORAVISION-P	On	1	1	Horizontal	As is	Off	–
THORAVISION-2L	On	1	2	Horizontal	As is	Off	–
DD-2on1-cp-L-I*	On	2	2	Horizontal	To Scale	Off	–
DD-2on1-lg-P-O*	On	1	2	Horizontal	To Scale	Off	–

8.4.2   # Information regarding the standard print protocols

This section describes the features of some PCR print protocols, as examples.

'Spine-P'

This protocol is based on the 'Normal' document type and is specially designed for the presentation of the spine. In the two halves (columns) two different projections of the spine are shown. Both appear at a scale of 100%.
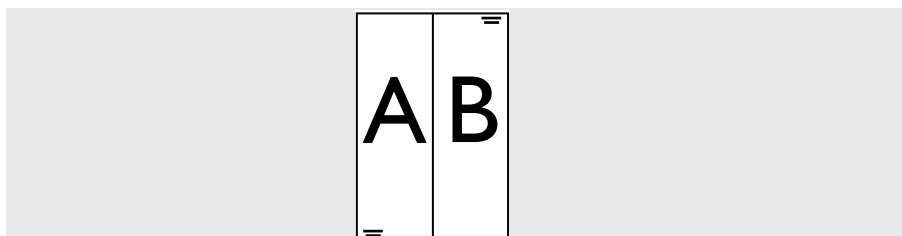
Fig. 8.10 'Spine-P'

N O T E   *During the exposure, make certain that the spine is shown on the image plate as centrally as possible, since in both partial areas only the centre image section is recorded. The margin areas of the exposed image plate are cut off automatically when this print protocol is used.*

'THORAVISION-P'

This print protocol is based on the 'THORAVISION' document type. It uses similar settings to those applied when printing from the 'THORAVISION' pulmonary X-ray unit. You therefore obtain documents which are almost identical. Only the film annotation differs slightly.
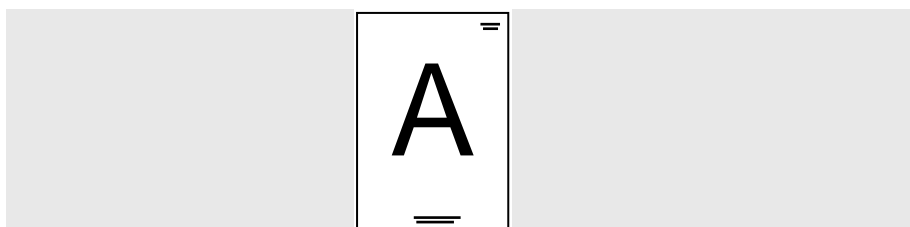
Fig. 8.11 'THORAVISION-P'

Mammo1on1 L and R

Regardless of the position of the film layout, in these print protocols mammo images are right or left justified in the film layout. If the 'Allow text placed on image' option is activated the text is positioned opposite the image.

Mammo 1on1

This print protocol is used to arrange two opposing mammo images in the typical left right display. The arrangement is controlled by the film layout position. An image with the positon 'one' is automatically justified to the right on the film, if applicable, the text information appears on the left-hand side if the 'Allow text placed on image' option is activated. An image with the position 'two', is justified to the left in the film layout with the text information, where applicable, on the right-hand side. If no information is available regarding the film layout position in the image, the text is justified to the left.
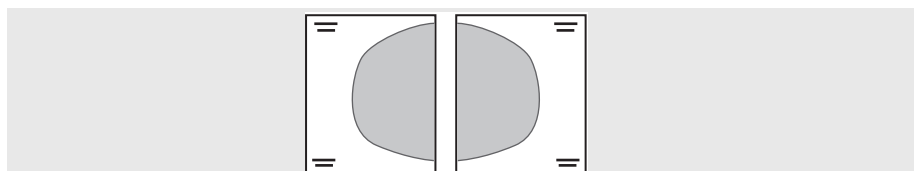
Abb. 8.12 Mammo 1on1

'Mammo-P'

This print protocol is based on the 'Mammo' document type. It places two or four mammo images on one film. There is no scale in the centre of the film. The images on the right side of the film are not rotated.
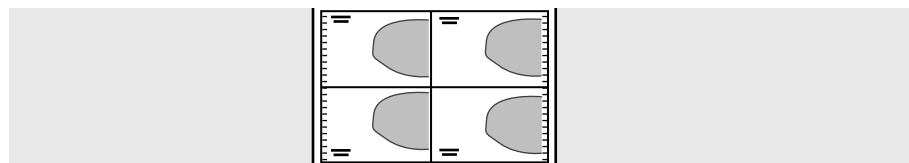
Fig. 8.13 'Mammo-P'

N O T E *The arrangement of images on the film is prescribed by the order in which the images were processed by the image reader. You can change the position of individual images for manual image output. For further information on this topic refer to the section „Determining the image sequence in a layout" on page 8-40.*

'Mammo-P-rot'

This print protocol is also based on the 'Mammo' document type. It rotates two or four mammo images into the usual right/left presentation. The images on the right film side are automatically rotated by **180°** and placed in such a way that they adjoin the images on the left. There is no scale in the centre of the film.
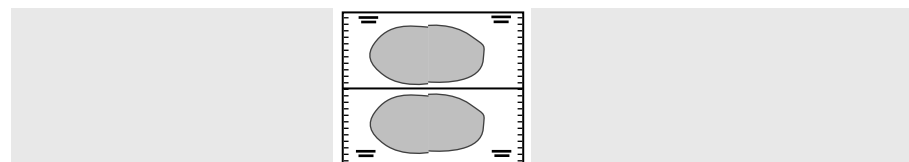
Fig. 8.14 'Mammo-P-rot'

N O T E *The arrangement of images on the film is prescribed by the order in which the images were processed by the image reader. You can change the position of individual images for manual image output. For further information on this topic refer to the section „Determining the image sequence in a layout" on page 8-40.*

'Mixed-L'

This print protocol is based on the 'Mixed' document type. It combines two different images on one film and presents these in the same scale. The prerequisite for this is that the same cassette size is used for both exposures. One image is in portrait, the other in landscape.
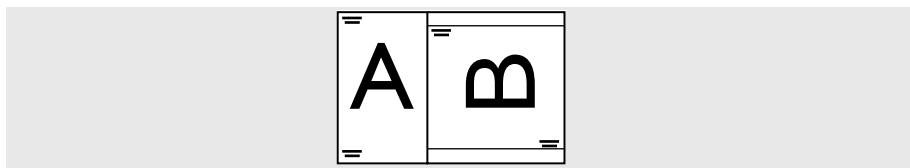
Fig. 8.15 'Mixed-L'

'2on1-P-zoom'

This print protocol is based on the 'Zoom' document type. It is subdivided into two equally sized areas (rows) and represents the same image in two different scales. On the left side of the film, the image is positioned at full size, on the right side, the enlarged image section appears.
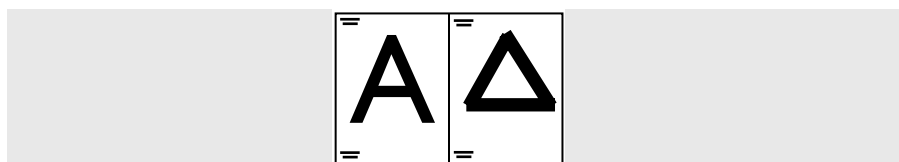
Fig. 8.16 2on1-P-zoom'

N O T E   *So that an image can appear in this presentation, you must first enlarge it on the display area. You can determine the required presentation size in the zoom window. Due to the almost square film area and the set portrait format, the image section depicted on the display area and on the film may differ slightly from one another. Therefore check the required image section in the print preview beforehand (see Fig. 8.1).*

8.5 Printing using print protocols

You can use the preset or user-defined print protocols for image output. You can call up the window 'Printing using protocols' in the PCR application or in 'Data handling'.

Print protocol list ——

Print preview

Page control

Fig. 8.17 'Printing using protocols' window

8.5.1 Printing in the PCR application

In the PCR application, you can print examinations which are currently depicted on the display area or individual images from this. If you open the 'Print protocols' window, all **marked images** on the entire display area are accepted into the print preview. As many film pages are generated as are required for exposure of the images. The order in which the images appear in the print preview corresponds to the sequence of marking. If, after calling up a new examination, no images have yet been marked, or all images have been unmarked, then the **complete** examination is accepted into the print preview.

NOTE   *To prevent unnecessary film consumption, check the automatically generated pages with the cursor keys before starting the printing job.*

Printing in the PCR application

1   If necessary, mark the images on the display area that you would like to print (see page 4-9).

2   Click this symbol button.

• The following window appears.

<table>
<tr><td>**Print protocols**</td><td>Print protocol list</td><td></td><td>Define printer codes (see page 8-41)</td></tr>
<tr><td>Edit...</td><td>Edit print protocols (see page 8-22)</td><td></td><td>Test prints</td></tr>
<tr><td>∧ ∨</td><td>List position of the print protocols</td><td>Exit</td><td>Close window</td></tr>
<tr><td>Printer DICOM-</td><td>Select connected printer</td><td>|◄</td><td>Switch to first film page</td></tr>
<tr><td>Medium 14x17</td><td>Select print medium, film format</td><td>◄</td><td>Switch to previous film page</td></tr>
<tr><td>Copies 1</td><td>Select number of copies per film page</td><td>►</td><td>Switch to next film page</td></tr>
<tr><td>⇉ Rush</td><td>Edit print job with priority</td><td>►|</td><td>Switch to last film page</td></tr>
<tr><td></td><td>Send print job</td><td></td><td></td></tr>
</table>

Fig. 8.18 'Printing using protocols' window

All marked images are accepted into the film preview. Depending on the basic setting only an unsharp image may be displayed in the film preview. The print protocol that is intended for the respective image type in the PCR system is automatically selected. If you have called up several examinations, the print protocol for the first examination appears.

3   If necessary, select a different print protocol.
    • In the print preview, the images are displayed according to the layout settings of the print protocol.

4   If necessary, override the basic settings of the selected print protocol (see page 8-22).

5   Determine the individual parameters for printing (see table).

6   Check the automatically produced film pages with the help of the arrow buttons.

7   Click this symbol key to send off the print job.

• A confirmation message appears.

The print job is processed in the background. You can check the status of this print job and other print jobs with the help of the status function. For further information on this topic refer to the section „Monitoring of processing procedures" on page 10-5.

Changing the list position of the print protocols

You can place frequently used print protocols at the top of the list.

Changing list position

1   Mark a print protocol in the print protocol list.

Fig. 8.19 Print protocol list.

2   Click on the arrow buttons to move the marked print protocol to a different position in the list.

8.5.2   **Printing in 'Data handling'**

In the 'Data handling' application, you can also print using print protocols. You can output the images from all data levels without previously displaying the images.

In the print protocol list, the print protocols for **all** applications are listed and labelled with the abbreviation of the modality. Print protocols used for CR images are labelled with the abbreviation 'PCR'.
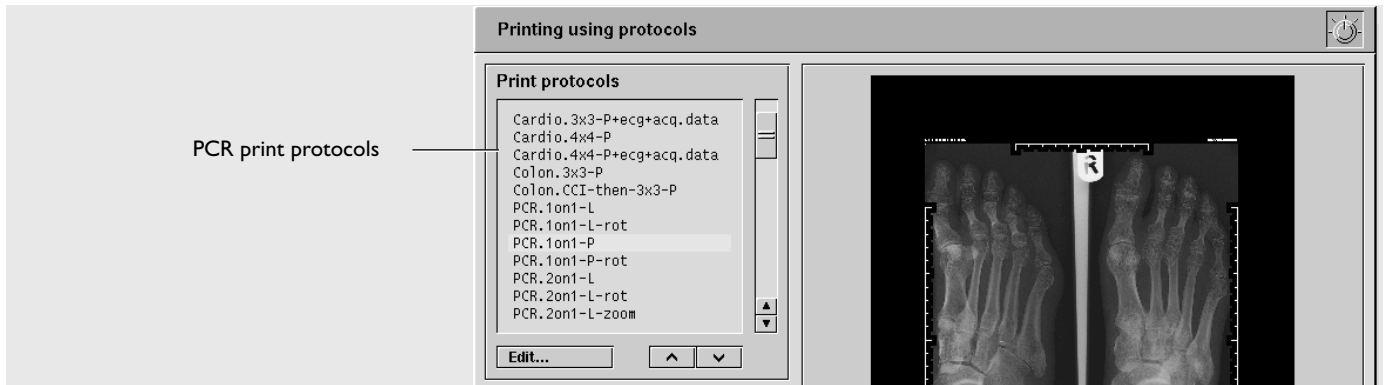
Printing in 'Data handling'

1   Open the required data level (see page 9-9).

2   If necessary, mark the images to be printed (see page 4-7).

3   Click this symbol button.
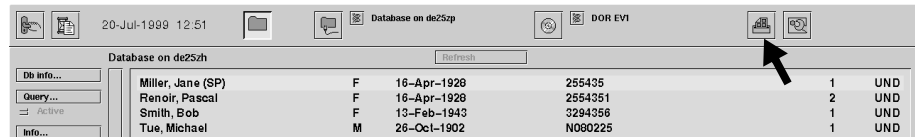
- The 'Print protocol' window appears (see page 8-18).

4   Continue as described in the previous section.

8.5.3   # Overriding print protocols

You can override the preset PCR print protocols permanently or temporarily
for a print job. To do this, use the 'PCR print protocol editor' in the PCR
application or in 'Data handling'.

Overriding print protocols

1   Click this button in the 'Printing using protocols' window - if necessary after
selecting a PCR print protocol.
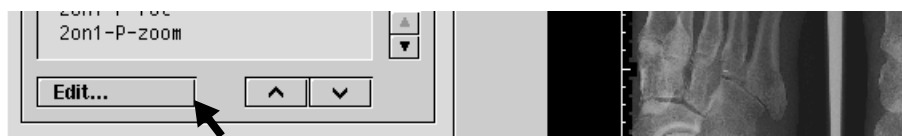
• The following window appears.
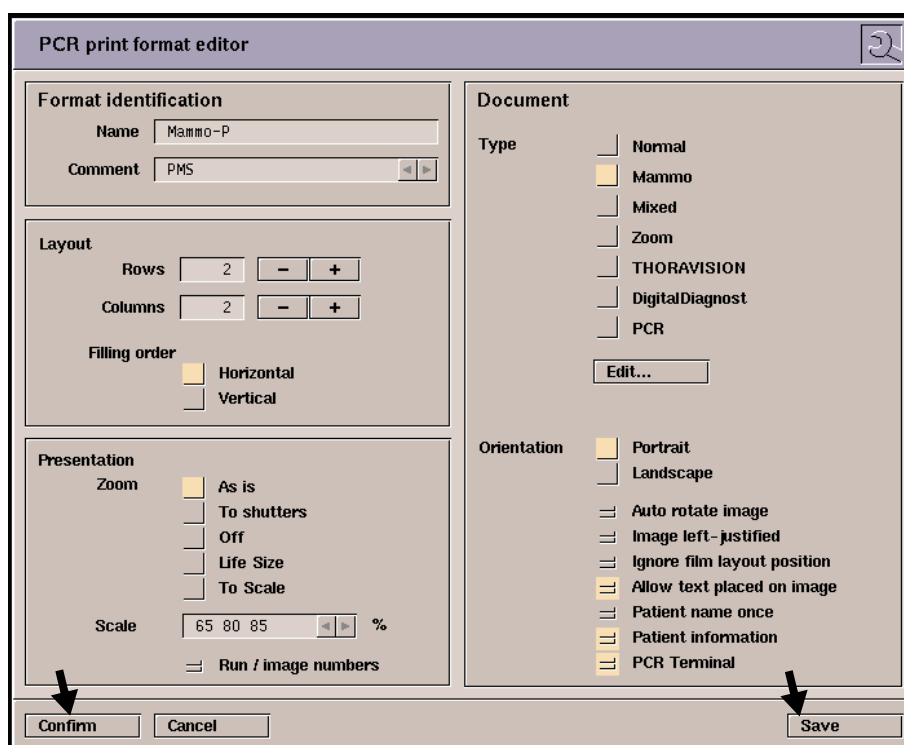
Fig. 8.20 'PCR print format editor' window

2   Select the required settings and click on 'Confirm', if you would like to **tem-
porarily** override the print protocol, or on 'Save' if you would like to override
it **permanently**.

Format identification	Entry fields for new print protocol names
Layout	
Rows 1 Columns 1	Determine the number of horizontal segments (rows) and vertical segments (columns) in the layout (see page 8-24)
Filling order	First fill the lines/columns with images (see page 8-24)
Presentation	
As is	(see page 8-25)
To shutters	By activating this option, the images are enlarged up to the image shutters regardless of the presentation size on the display area.
Off	Activation of this option causes the zoom settings which were activated on the display area to be ignored.
Life Size	With activation of this option, the image is accepted into the film layout at a 100% scale. The term 'life size' relates to the depiction size on the image plate.
To Scale	(see page 8-25)
67 90 100 ◄ ► %	Entry of scales (in %) for the film layout
Run / image numbers	Show/hide image numbers
Document	Select document type (see page 8-11)
Orientation	
Portrait Landscape	Select print medium in portrait/landscape
Image left-justified	Positions the image on the left margin of the film. If text information appears on the image, it is right-justified in the image.
Auto rotate image	Activate automatic image rotation (see page 8-26)
Ignore film layout position	Use/ignore preset position of an image in the layout (see page 8-40)
Allow text placed on image	Position text inside/outside an image (see page 8-25)
Patient name once	By selecting this option, the patient's name and hospital name are displayed in the global fields.(see page 8-32).
Patient information	Show/hide patient data
PCR Terminal	Allows the transfer of the print format to the PCR terminal (see page 8-25).
Confirm	Override print protocol temporarily
Cancel	Cancel procedure
Save	Override print protocol permanently

Resetting changes

Print protocols with overridden settings are shaded in the print protocol list. To reset the print protocol to its original settings, click the shaded print protocol in the list.

8.5.4 Settings for the print formats

The following sections provide further information on the functions in the 'PCR print format editor' window.

Rows/Columns

The area for images on a film can be subdivided into several horizontal segments (rows) and vertical segments (columns). The following example shows a film layout with 2 rows and 2 columns.
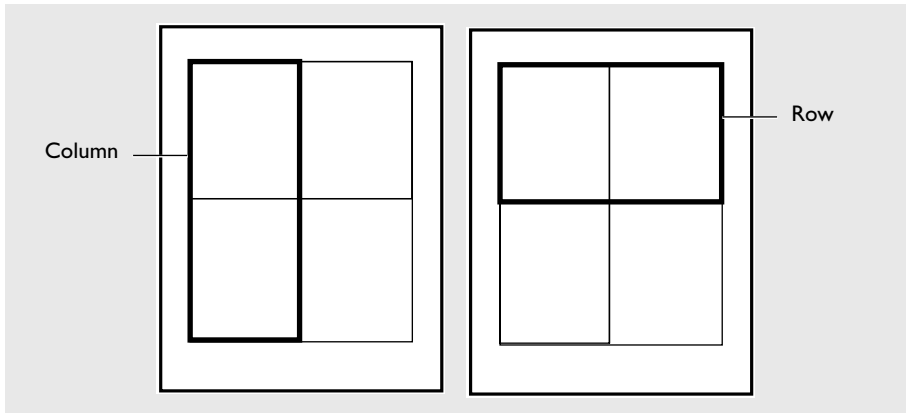
Fig. 8.21 Subdivided layout

'Filling order'

In a subdivided film layout, the filling order determines the sequence in which the segments are filled with images.
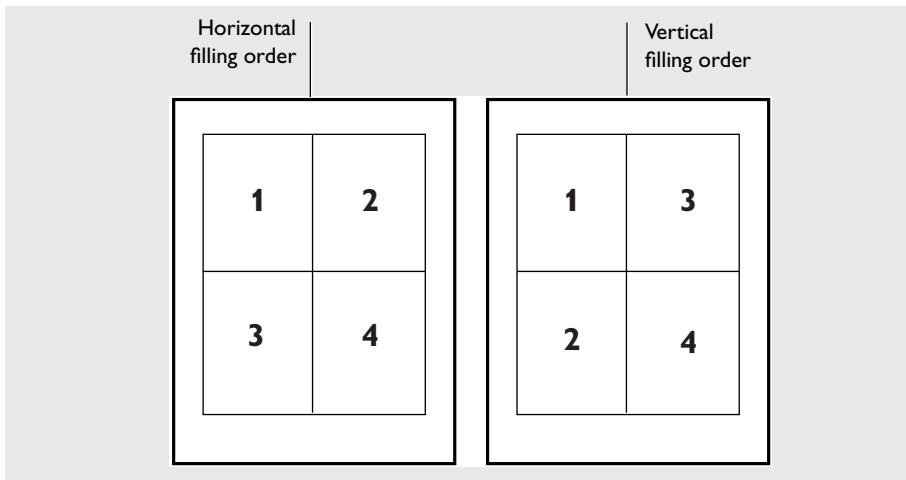
Fig. 8.22 Filling orders

'As is'

This option is preset for most print protocols. The image is accepted into the film layout in the form depicted on the display area, if applicable, with an image section enlargement. The scale of the image is automatically adjusted in such a way that the image is depicted as large as possible within the selected film format without cutting off the margins. Image section enlargements (Zoom) can result in information loss at the margins.

'To scale'

Activation of this option permits the acceptance of defined scales which are listed in entry field immediately below. If there is not enough room available for depiction at a particular scale, the next smaller one is chosen automatically. If a smaller scale is not available, the image is cut off at the margin.

'Allow text placed in image'

The 'Allow text placed in image' function permits placement of text information in or outside an image. If text information is placed in an image, diagnostically relevant image information may be concealed.
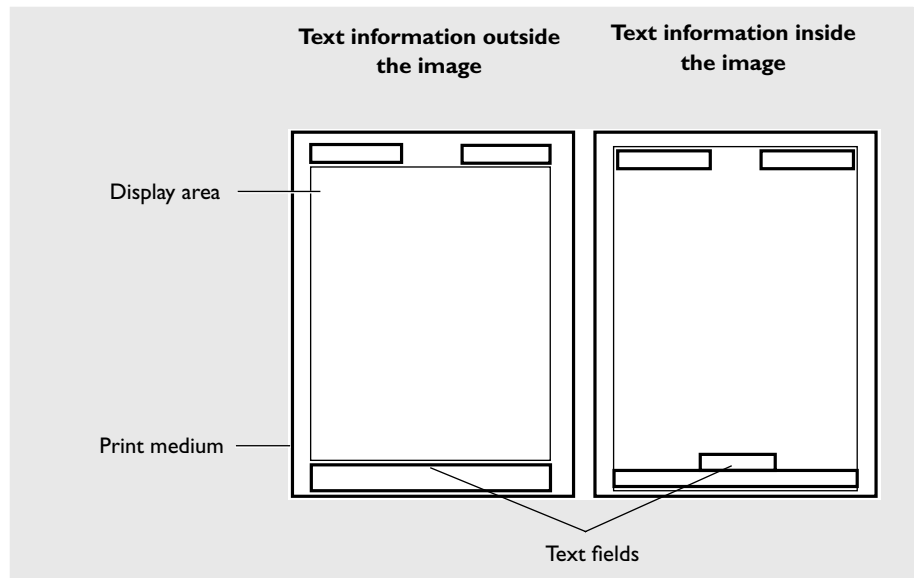
Fig. 8.23 'Normal' document type

'PCR terminal'

This option makes it possible to transfer a print format to the PCR terminal. After activating the option a restart has to be performed at the PCR terminal. Then the print format appears in the 'Image options' window.

Font sizes

The font sizes for text information are automatically adapted, depending on the space available in the layout. Only if the patient name is extremely long and very little space is available the patient name may be automatically abbreviated.

Working with scales

In the 'To scale' input field you can enter defined scales between 20% and 200% in any ascending order. If you additionally activate the 'To scale' option, the largest possible scale is automatically selected without cutting off the image at the margins. However, if a complete presentation is impossible even at the smallest scale, the image is then cut off at the margins accordingly. The 'As is' option prevents the image margins being cut off. Here the scale is automatically selected so that the image is always completely accepted into the film layout.

Entering scales

1   Activate the 'To scale' option.

2   Enter the required scale and confirm with the Enter key.
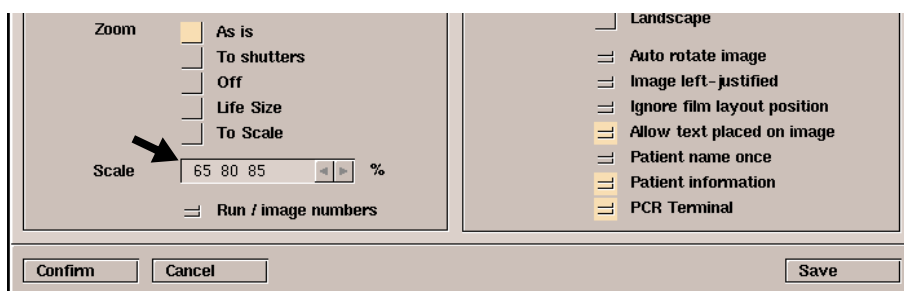
3   Click on 'Confirm' or 'Save'.

Auto rotate image

This function automatically rotates an image, depending on its type, by 90º or 180º. All normal PCR image types are rotated by 90º if they thus have more room on the film layout. A mammo image with the film layout position two, i.e. on the right side of the film, is rotated by 180º. This option is already activated in the standard print protocol Mammo-P-rot.

8.5.5   Editing the film labelling

The PCR print format layout editor can be used to position various DICOM data elements and other details on the film. You can remove individual data elements from the film labelling or add additional elements, and you can alter the arrangement in the film layout. For demonstration purposes you can make images anonymous by removing unwanted data elements. Further information on film labelling can be found in the "PCR System" folder in the "System Information" module.

N O T E   *The formatting of film labelling is allocated to the document types. If the film labelling of a document type is modified, then the modification applies accordingly to all print protocols based on the document type that was edited. For further information on this topic refer to the section „Standard print protocol overview" on page 8-12.*

Information regarding procedure

In order to simplify the process of setting the film labelling, the following information should be observed:

1 Select an image from the database and mark it on the display area.

2 Select the smallest film format in the print dialogue, for example 8 x 10, so that the text information in the print preview appears as large as possible.

3 When saving changes, ensure that the film labelling is a property of the document type (e.g. normal) to ensure that all print protocols which are based on this document type are changed.

4 To gain a quick understanding of how this functions it is recommended that you firstly delete all data elements except the element 'Patient info' element 15 (see page 8-30).

5 Edit the properties of this data element to familiarise yourself with how they function.

6 After having set the parameters click 'Save' in the PCR print format layout editor window (see page 8-28) followed by 'Confirm' in the "PCR print format editor" window (see page 8-22).

7 Check in the film preview that the result meets your expectations.

8 If yes, add further data elements for this document type. To save click 'Save' in the 'PCR print format editor' window (see page 8-22).

Basic principles behind the data elements

The 'PCR print format layout editor' window offers all the data elements for selection which are used for film labelling for different document types. Details of how to call up this window can be found under „Adding/deleting data elements" on page 8-36.
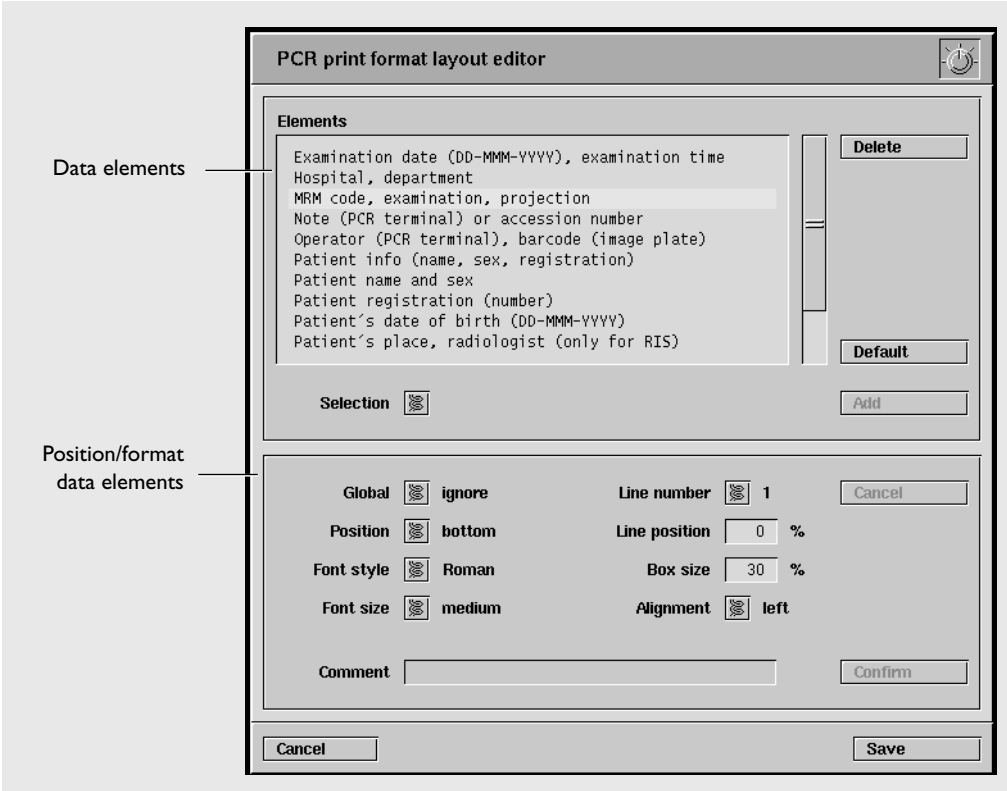
Fig. 8.24 Data elements

Overview of data elements
The table below shows the data elements that are available and the associated document types which use each data element as per factory settings. Further information on the attributes contained in the 'Global' column can be found under „Functionality of the global attributes" on page 8-32.

NOTE

- *Many data elements are composed of several individual pieces of information. Individual parts of a data element cannot be suppressed. If necessary, the required information must be made up from several other suitable data elements.*
- *Various different data elements are used for document type 'Mammo' depending on the optional 'Allow text placed on image' option.*

No.	Data element	DICOM designation	Docum. type	Global	Comment
1	Acquisition parameters	Sensitivity, Filter Type, Tomo Layer Height, Tomo Angle, Tomo Time, Distance Source to Detector, Grid	DigitalDiagnost	ignore	For DigitalDiagnost images
2	Examination date (DD-MM-YYYY), exmination time	Content Date, Content Time	Normal Mammo Mixed Zoom PCR	ignore ignore ignore ignore ignore	For CR images (and possibly also DigitalDiagnost and THORAVISION images)
3	Examination, projection, patient position	Study Description, Patient Position, Patient Orientation	THORAVISION	ignore	For THORAVISION images. Exception: this data element appears on the film as modified PatientPosition if the THORAVISION image has been rotated or mirrored. If the note is no longer required, it can be deleted at the users discretion.
4	Examination, projection, S value, L value	Study Description, Patient Position, Sensitivity	PCR	ignore	For CR images
5	Exposure parameters	KVP, Exposure, Exposure Time, Image Area Dose Product, Operator's Name	DigitalDiagnost THOARAVI-SION	ignore ignore	For DigitalDiagnost and THORAVISION images
6	Hospital, department	Institution Name, Institutional Department Name	Normal Mammo Mixed Zoom THORAVISION DigitalDiagnost PCR	both both both both both both both	For CR, DigitalDiagnost and THORAVISION images
7	Image number and processing type	Acquisition Number, Instance Number, Postprocessing Function, Acquisition Time	DigitalDiagnost THOARAVI-SION	ignore ignore	For DigitalDiagnost and THORAVISION images
8	Manufacturer	Manufacturer	DigitalDiagnost	both	For DigitalDiagnost images (and possibly also CR and THORAVISION images)
9	MRM code and MODE	Instance Number	PCR	ignore	For CR images Menu code and read mode
10	MRM code and MODE, barcode (image plate)	Plate ID	DigitalDiagnost	ignore	For DigitalDiagnost images (and possibly also CR images)

No.	Data element	DICOM designation	Docum. type	Global	Comment
11	MRM code, examination, projection	Study Description, Patient Position	Normal Mammo Mixed Zoom	ignore ignore ignore ignore	For DigitalDiagnost images (and possibly also CR images)
12	Note (entered at the PCR terminal)	–	PCR	ignore	For CR images Like data element no. 13, but here as a single element
13	Note (PCR terminal) or accession number	Accession Number or Study ID	Normal Mammo Mixed Zoom	ignore ignore ignore ignore ignore ignore	For CR images Note entered on the PCR terminal in the 'Annotation' field under 'Image options'; in the absence of a note Study ID
14	Operator (PCR terminal), barcode (image plate)	Operator's name, Plate ID	Mammo Mixed Normal PCR Zoom	ignore ignore ignore ignore ignore	For CR images Operator code and image plate barcode entered on the PCR terminal
15	Patient info (name, sex, registration)	Patient's Name, Patient's Sex, Patient ID, Patient's Birth Date, Accession Number, Patient's Institution Residence, Referring Physician's Name	Normal Mammo Mixed Zoom PCR	on on on on both	For CR, DigitalDiagnost and THORAVISION images
16	Patient info with image date	Content Date, Patient's Name, Patient's Birth Date, Patient ID, Ohter Patient IDs	DigitalDiagnost THOARAVI-SION	both both	For DigitalDiagnost and THORAVISION images
17	Patient name and sex	Patient's Name, Patient's Sex	Normal Mammo Mixed Zoom	off off off off	For CR images (and possibly also DigitalDiagnost and THORAVISION images)
18	Patient registration (number)	Patient ID	Normal Mammo Mixed Zoom	off off off off	For CR images (and possibly also DigitalDiagnost and THORAVISION images)
19	Patient's date of birth (DD-MM-YYYY)	Patient's Birth Date	Normal Mammo Mixed Zoom	off off off off	For CR images (and possibly also DigitalDiagnost and THORAVISION images)

No.	Data element	DICOM designation	Docum. type	Global	Comment
20	Patient's place, radiologist (only for RIS)	Patient's Institution Residence or Referring Physician's Name	Normal Mammo Mixed Zoom	ignore ignore ignore ignore	For CR images Location of patient or name of radiologist if there is a connection to RIS
21	Pixel size	Pixel Spacing	DigitalDiagnost THOARAVISION	ignore ignore	For DigitalDiagnost and THORAVISION images (and possibly also CR images)
22	Print protocol comment	–	–	–	For CR images Comment entered in the 'Print format editor' window
23	Processing parameters	Acquisition Device, Processing Description	Normal Mammo Mixed Zoom THORAVISION DigitalDiagnost PCR	ignore ignore ignore ignore ignore ignore ignore	For CR, DigitalDiagnost and THORAVISION images
24	Product and manufacturer	Manufacturer	THOARAVISION	ignore	For THORAVISION images (and possibly also CR and DigitalDiagnost images)
25	S value, L value, image reader mode	Sensitivity	Normal Mammo Mixed Zoom	ignore ignore ignore ignore	For CR images
26	Scale (%)	–	Normal Mammo Mixed Zoom THORAVISION DigitalDiagnost PCR	ignore ignore ignore ignore ignore ignore ignore	For CR, DigitalDiagnost and THORAVISION images
27	View info	Manufacturer's Model name, Study Description, Patient Orientation, Content Time	Digital-Diagnost	ignore	For DigitalDiagnost images

Fields and lines for film labelling

The various data elements can be configured by the user in terms of their appearance on the film. For this purpose the film layout can be divided into top and bottom lines throughout the film (global top and bottom lines) and in top and bottom lines for each image (image top and bottom lines).

Global top and bottom lines are created by selecting the option 'Patient name once' (see Fig. 8.20). With the factory settings, the patient name then appears in the global bottom line and the hospital name (hospital, department) in the global top line. These data elements are at the same time removed from the corresponding image lines.
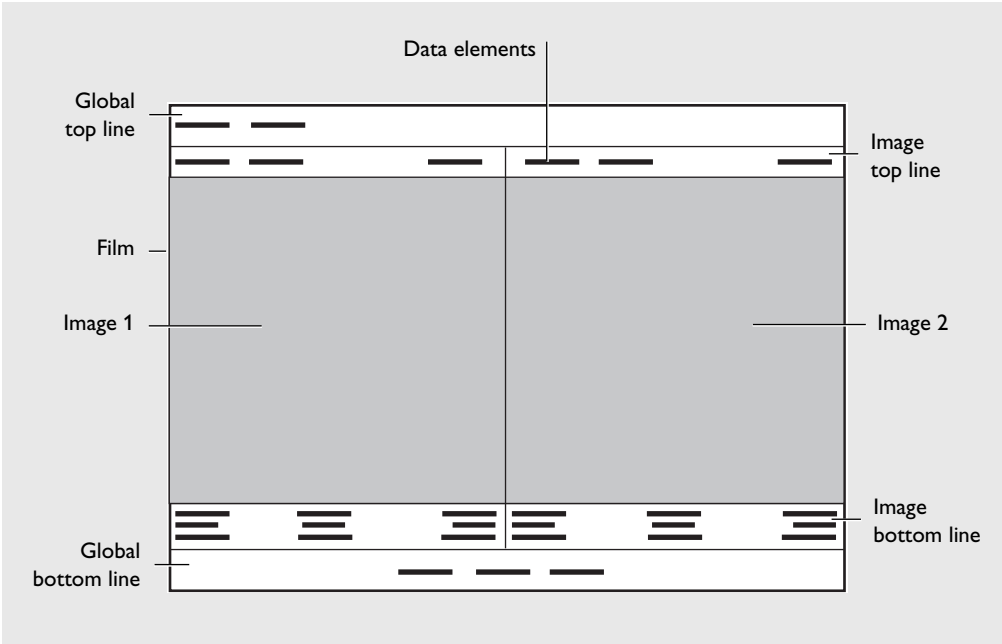
Fig. 8.25 Fields for film labelling

Global top and bottom lines are configured in advance as single lines, and this setting cannot be changed. The image top and bottom lines may consist of more than one line depending on document type. The number of lines can be increased by the user to a maximum of five.

Global top and bottom lines are created by selecting the option 'Patient name once' (see Fig. 8.20). The patient name then appears in the global bottom line and the hospital name (hospital, department) in the global top line. These date elements are at the same time removed from the corresponding image lines.

Functionality of the global attributes

Every data element has a global attribute assigned to it. There are four different global attributes, namely 'on', 'off', 'both' and 'ignore'. These attributes determine how the data elements behave when the option 'Patient name once' is selected (see Fig. 8.20). A data element always appears either on the global level in the top and bottom lines of the film or on the image level in the top and bottom lines below each image. The variants of the different global attributes are described below.

Global attribute 'on'
The purpose of global attribute 'on' is to display particular data elements, such as the patient name, in a global line only.

Global attribute	Patient name once	Result
On	On	Data element only appears in the global top or bottom line.
On	Off	Data element does not appear at all.

Global attribute 'off'
The purpose of global attribute 'off' is to remove particular data elements from the image lines when the option 'Patient name once' is selected to prevent them from appearing twice on the film.

Global attribute	Patient name once	Result
Off	On	Data element does not appear at all.
Off	Off	Data element appears under each image in the image top or bottom line.

In the film layout pre-configured at the factory, individual data elements with the global attribute 'off' are linked with other elements with the attribute 'on'. Thus, for example, data element 15, 'Patient info (Name, Sex, Registration)' with the global attribute 'on' appears in the global bottom line if the option 'Patient name once' is selected. At the same time, data element 17 'Patient Name and Sex' with the global attribute 'off' is removed from the image line. When the option is deselected, this process is reversed.

Global attribute 'both'
The purpose of the global attribute 'both' is to display certain data elements either in the image lines or in the global lines.

Global attribute	Patient name once	Result
Both	On	Data element only appears in the global top or bottom line.
Both	Off	Data element appears under every image in the image top or bottom line.

Global attribute 'ignore'

The purpose of the global attribute 'ignore', which is the most frequently occurring global attribute, is to display data elements in the image lines irrespective of whether or not any global lines are present. The option 'Patient name once' thus has no effect on the appearance of data elements with this global attribute.

Global attribute	Patient name once	Result
Ignore	On	Data element appears under every image in the image top or bottom line.
Ignore	Off	Data element appears under every image in the image top or bottom line.

Adjustment of display area and font size

EasyVision RAD automatically adjusts the size of display area and the font size of the film labelling. The following rules apply.

Display area

The display area is always - taking the current settings into account - set to the maximum size. It is reduced in size automatically if global lines are created through the command 'Patient name once', or if the number of image lines is increased. In other words, the scale of the image may be altered as a result of editing the film labelling. The scale is only fixed if a single value has been specified in the entry field 'Scale'.

Font size

If a data element appears in a global line, it is automatically displayed in a larger font than in the image top line or bottom line. Otherwise the font size can be selected between 'small', 'medium' and 'large'. However, EasyVision RAD reduces the font size automatically if the box is too small to display the data element. If even the smallest font size (approx. 2 mm) is unable to display the entire text, then the text is automatically truncated at the end.

NOTE   *To prevent text from being truncated, always select an adequate box size for a data element (see page 8-35).*

Notes on box size and line position

Each data element appears in an invisible box which forms a border around the text contained in it. When a data element is configured, the size and position of the box must be specified. Furthermore, the text can be left-aligned, right-aligned or centred within the box.

When choosing the correct size of box, the amount of free space on the line concerned must be taken into account as well as the text length and the desired font size of the data element. The box size is entered as a percentage, with the size of the image serving as the reference size. In the case of film layouts for more than one image, the box size refers to the size of a segment as shown by the example below.

A box with a size of 100% extends in a line over the complete image or segment. If, on the other hand, three data elements are to appear in one line, as shown in the example below, then a box size of around 30% is optimum.
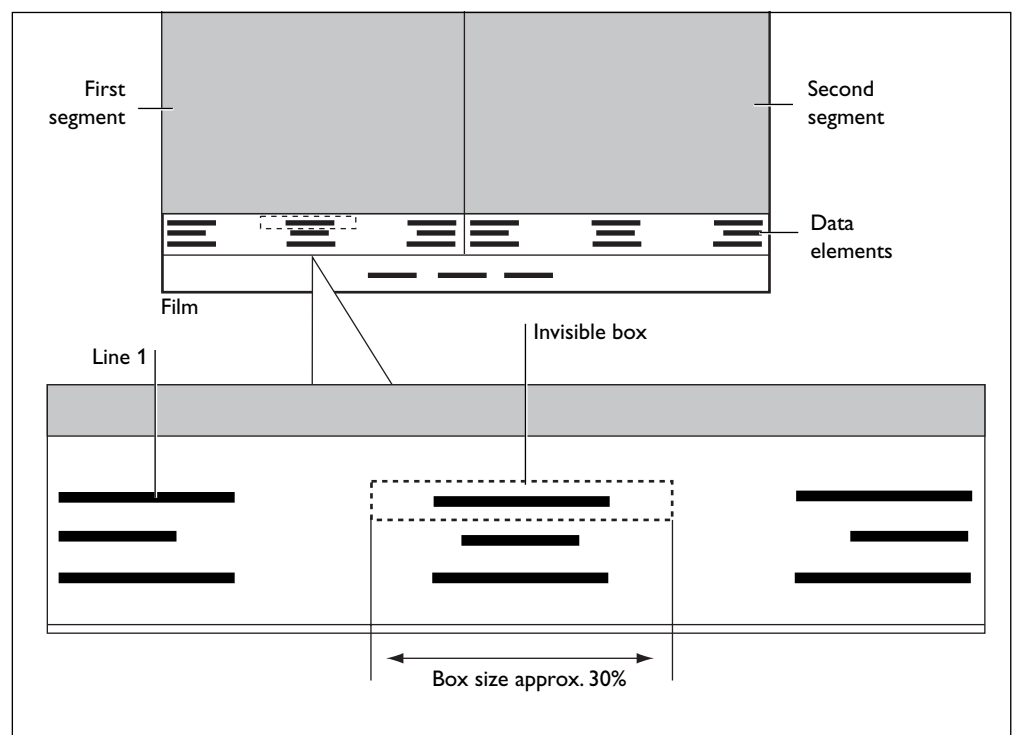
Fig. 8.26 Position and size of a box

N O T E   *With document type 'DigitalDiagnost' the box size relates to the film when the option 'Allow text placed on image' is deselected.*

The option 'Line position' is used to align the box horizontally within a line. As with box size, this parameter is entered as a percentage; the following values are typical:
- 0%   = The box is positioned at the left edge of the line.
  Combine this orientation with the left-justified text alignment. With right-justified and central alignment, the text may be either not at all or only partially visible.
- 50%   = The box is positioned in the centre of the line (see Fig. 8.26).

• 100% = The box is positioned at the right edge of the line.
Combine this orientation with the right-justified text alignment. With
left-justified and central alignment, the text may be either not at all or
only partially visible.

If the box size is too small to display the data element, then the font size is
reduced automatically. If even the smallest font size (approx. 2 mm) is unable
to display the entire text, then the text is automatically truncated at the end.

N O T E   *To avoid truncation of the text you must always select an adequate size of box for the*
data element concerned.

Adding/deleting data elements

You can add or delete individual data elements to/from the film labelling.

N O T E   • *Only use a data element for images that actually contain the corresponding data*
record in accordance with the DICOM conformance statement.
• *Before integrating a new data element you should check that sufficient free space is*
available in the intended position. Each position in the film layout can be assigned
only once, as errors in the display might otherwise result. You should therefore first
gain an overview of the data elements that already exist in the document type and
the relevant settings of these elements. If necessary other elements must be moved
or removed.

Add/remove elements

1   In the 'PCR print format editor' window select the document type whose
film labelling you wish to edit.

2   Next, click on 'Edit...'.
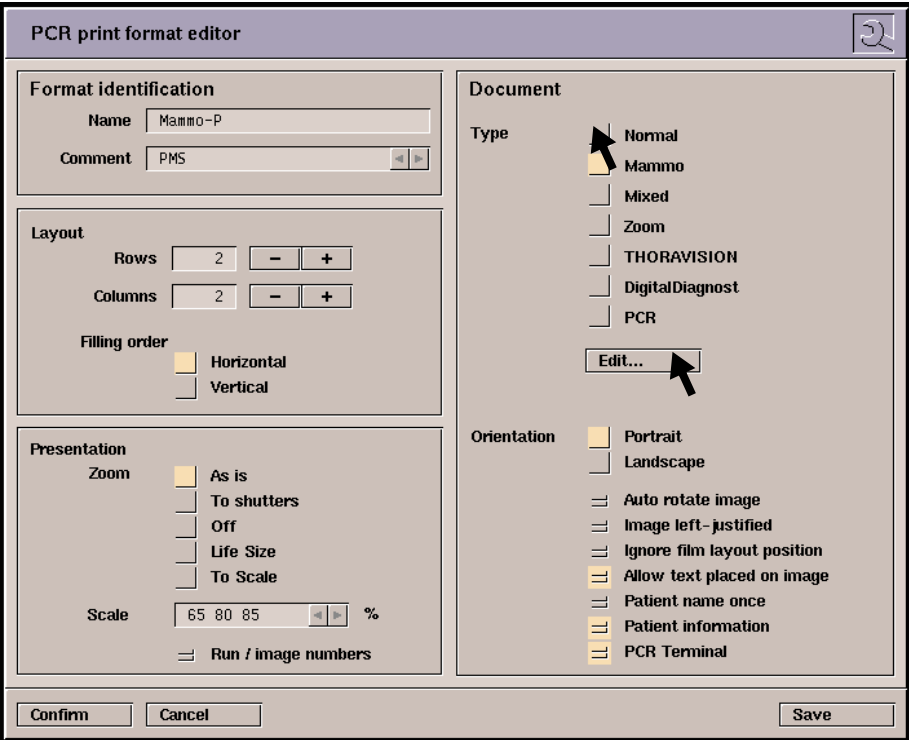
Fig. 8.27 Edit film labelling

• The following window appears:

Elements	List of all data elements currently appearing in the film layout.
Delete	Deletes previously selected data elements from the 'Elements' list field, and thus from the film layout. Deleted elements appear in the 'Selection' list again.
Default	Resets all the document type settings to the factory settings.
Add	Adds a data element from the 'Selection' list to the film layout. The data element concerned is removed from that list and appears in the 'Elements' list field.
Selection	Contains a list of elements that are still available and which do not yet appear in the film layout.
Cancel	Resets any changes made to the selected element and closes the window.
Save	Saves all changes made to the film layout and closes the window.

Fig. 8.28 Add/delete data elements

1 Select the data element that you wish to add or remove in the 'Elements' list field or under 'Selection'.

The 'Elements' list field contains the data elements that are currently displayed, while listed under 'Selection' are those elements that are not displayed.

2   Click 'Add' or 'Delete'.

3   Click 'Save'. You will only be able to see the result of your editing in Print Preview if you have also clicked the 'Save' button in the 'PCR print format editor' window (see Fig. 8.27).

If you have added a new data element, you can now define its position and formatting.

Defining position and formatting

1   In the 'Elements' list in the 'PCR print format layout editor' window, choose the data element that you would like to edit (see Fig. 8.28).

2   Select settings for the following position and formatting options for the data element.

Control	Description
Global ⸬ ignore	Select global attribute (see page 8-32)
Position ⸬ bottom	Define position in the film layout 'top' = the element appears above the image 'bottom' = the element appears below the image
style ⸬ Roman	Select font style 'Roman' = normal characters 'Bold' = bold characters
Font size ⸬ medium	Select font size 'small', 'medium' or 'large' (see page 8-34)
Line number ⸬ 1	Select the line in the film layout (see page 8-32) in which the data element is to appear
Line position 0 %	Enter line position (see page 8-35)
Box size 30 %	Enter box size (see page 8-35)
Alignment ⸬ left	Select text alignment within the box 'right', 'left', 'center'
Comment	'Print protocol comment' text display for the data element
Cancel	Resets any changes made to the selected element and closes the window
Save	Saves all changes made to the film layout and closes the window.

3   Click on 'Save'. You will only be able to see the result of your editing in Print Preview if you have also clicked the 'Save' button in the 'PCR print format editor' window (see Fig. 8.27).

8.5.6   Creating new print protocols

You can create new print protocols and use these for manual printing from the EasyVision RAD workstation. For this task, call up the 'PCR print protocol editor' from the PCR application or from 'Data handling'. To use new print protocols for automatic printing from the PCR terminal, additional system settings are necessary. In this case, please notify the Philips Customer Service.

Creating new print protocols

1   In the list, select a PCR print protocol that you would like to use as the basis for a new print protocol and then click on this button.

- The 'PCR print format editor' window appears (see Fig. 8.20).

2   Enter the name for the new print protocol and, if necessary, a comment.
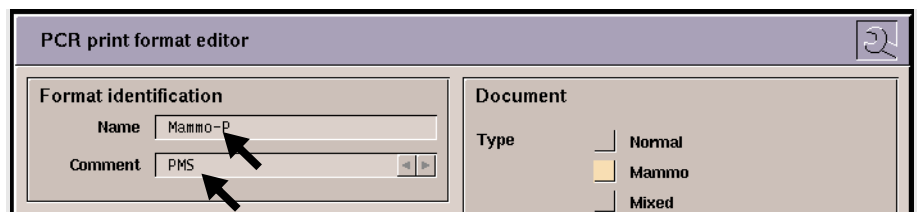
The comment appears on the PCR terminal in the 'Film format' window below the print protocol that is listed when the print protocol is transferred to the PCR terminal. The comment can also be output as a film label. The data element 'Print protocol comment' should be added to this.

3   Select the settings for the new print protocol (see page 8-22).

4   Click this button.
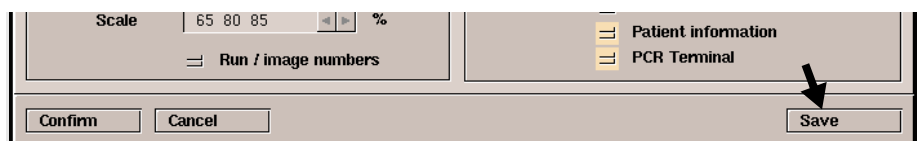
The new print protocol appears in the print protocol list. You can use it for manual print jobs.

8.5.7   Determining the image sequence in a layout

For print protocols which involve several images per film page, you can select the sequence of the images. When processing CR images, the images are assigned a specific position in the layout. You can change this position or replace images at a specific position with other images. The sequence in which the images are accepted into the layout is determined by the order in which you **mark** them on the display area.

Determining the image sequence
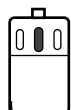
1   Call up the examinations whose images you would like to combine on a film.
   • The images are placed on the virtual display area.

2   With the help of the 'Navigation' window, position all images in the displayed segment and mark the images using the **centre** mouse button in the sequence in which you wish them to appear on the film.

3   Click this symbol button.
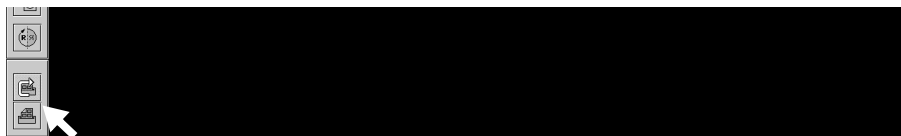
   • The 'Printing using protocols' window appears (see Fig. 8.18).

4   If necessary, select a PCR print protocol for several images per film page.

5   Click the 'Edit' button.
   • The 'PCR print format editor' window appears.

6   If necessary, activate the 'Ignore film layout position' function.
   • The saved position in the layout is ignored.

The images are accepted into the selected layout in the order of marking.

8.6   Setting the printer code

Printer codes are used for automatic control of connected printers and their print media (film/paper/format). They are used in conjunction with the print protocols on the PCR terminal and consist of an upper or lower case code letter from A to Z. Every code letter contains a specific combination of a printer and a corresponding print medium.

1on1-L:A

Printer code 'A' (entered by user)

Separator (set by system)

Name of the print protocol
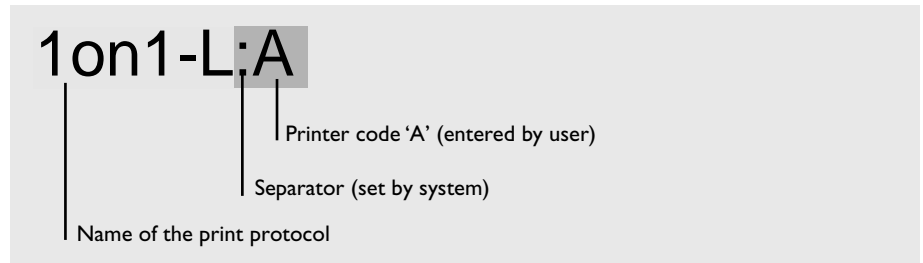
Fig. 8.29 Example: Printer code 'A'

NOTE   *The code letter for the printer code is entered at the EasyVision RAD workstation. However, it appears only in the print protocol list on the PCR terminal (interactive 'Image options' window) and not in the print protocol list in the EasyVision RAD workstation. Printer codes are not intended for manual print jobs from the EasyVision RAD workstation, but rather for automatic printing from the PCR terminal. There they are used for routine processing or can be manually selected via the interactive 'Image options' window.*

8.6.1   Information regarding application

The creation and editing of printer codes are equally a Customer Service function and a user function. The individual tasks are divided as follows.

Tasks of the Philips Customer Service

The Philips Customer Service creates all necessary printer codes when the PCR system is installed and assigns them to the examinations and views in a setup file for routine processing. New printer codes for routine processing are set up only by Philips Customer Service.

User tasks

The user can change existing printer codes for routine processing, e.g. by selecting another connected printer. He can create additional printer codes but these cannot be used for routine processing. That requires further system settings which can only be performed by Philips Customer Service. Additional printer codes appear on the PCR terminal in the interactive 'Image options' window and can be selected manually here.

8.6.2   **Editing printer codes**

You can create new printer codes or edit existing ones. To do this, the 'Medium and printer code' is opened in the 'Printing using protocols' window.

NOTE   *Do not delete any existing printer codes used in routine processing. This leads to error messages and disturbances in the PCR system.*

Editing printer codes

1   Click this button in the 'Printing using protocols' window (see Fig. 8.18).

•   The following window appears.

New...	Create new printer codes
Edit...	Edit existing printer codes
Delete...	Delete marked printer codes
Exit	Cancel procedure
Save	Save settings
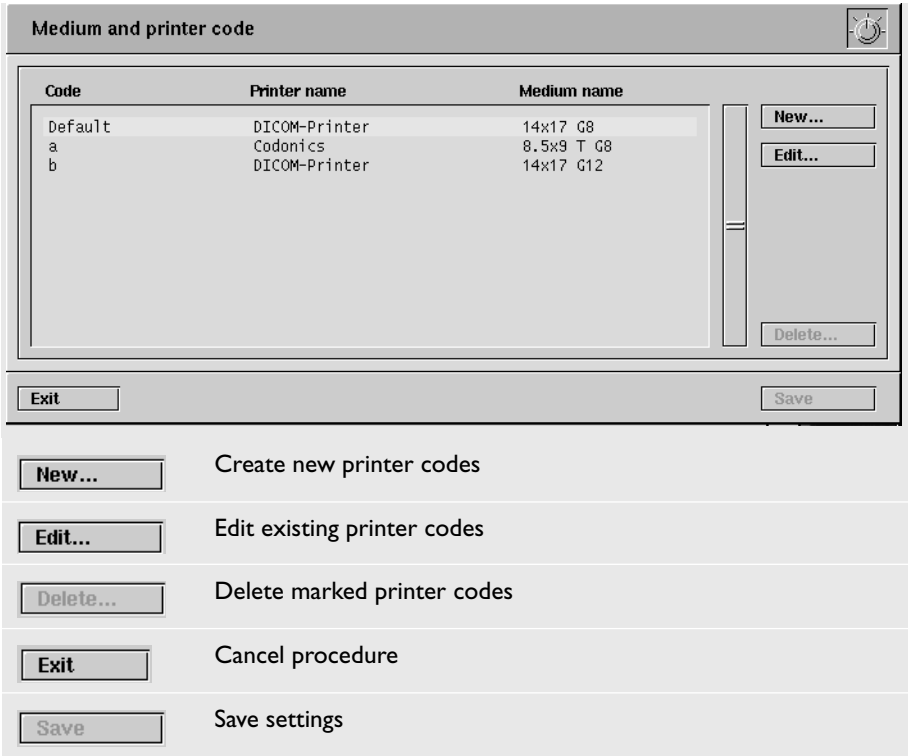
Fig. 8.30 'Medium and printer code' window

2   Click on 'New ...' or mark an existing printer code and click on 'Edit'.

   • The following window appears.

Fig. 8.31 'Medium and printer code' window

3   Enter a lower or upper case code letter from A - Z in the 'Code' field.

NOTES
   • *The ':' separator is assigned by the system and must not be entered manually.*
   • *Do not enter any print protocol names, but only the code letter.*
   • *Letters written in lower or upper case are differentiated and treated as different printer codes.*

4   Select the printer and the print medium and click on 'Confirm'.

5   Repeat these operating steps for all printer and print medium combinations that you would like to create or edit.

6   Restart the PCR terminal.

   If you have created a new printer code and no printer code was available before, an error message then appears on the PCR terminal. Its contents refer to the anatomic database. Ignore this error message.

   All defined printer codes appear in the interactive 'Image options' window as an appendix behind the name of the print protocols. If you have created several printer codes, each print protocol appears several times, according to the number of printer codes. If you would like to use the printer code for routine processing, please notify Philips Customer Service.

Default printer code

The list of printer codes contains a default printer code which cannot be deleted.

Default printer code ———
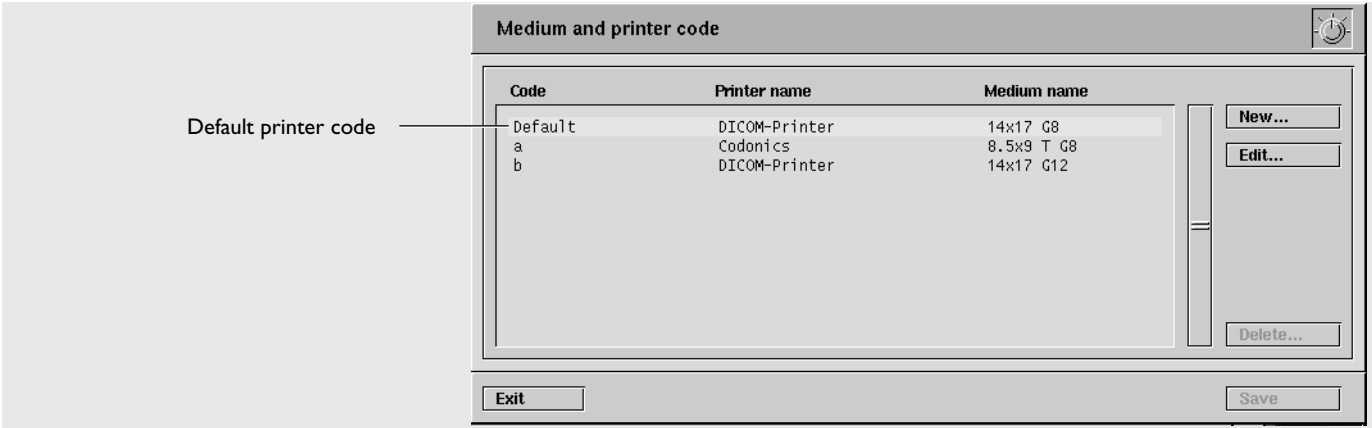
Fig. 8.32 Default printer code

The user applies the default printer code if the system is operating with only one connected printer and only one film or paper cassette is being used for all print jobs.

The EasyVision RAD workstation automatically selects the default printer code if a print job has **no** printer code or an **unrecognised** one.

Chapter 9   Data handling 9-3

Philips Medical Systems December 2003

9 Data handling

The following sections in this chapter describe tasks which you can perform in the 'Data handling' application. This includes the transfer and storage of examinations in various file formats and specifying deletion conditions for incoming images.

In the PCR application, you can delete, transfer or store individual called-up examinations after clicking this symbol button (see page 9-4).

In the 'Data handling' application, on the other hand, you have access to all handling functions and all stored examinations.

Fig. 9.1 'Data handling' application

9.1   # Data handling in the PCR application

You can delete currently called-up examinations in the PCR application, store them on external data media or transfer them to different data stations - without changing to 'Data handling'.

⚠

DANGER   *Deleted images cannot be restored. Before deletion, check whether the images are still needed.*

Deleting, storing, transferring examinations.

1   Click this symbol button.

• The following window appears.
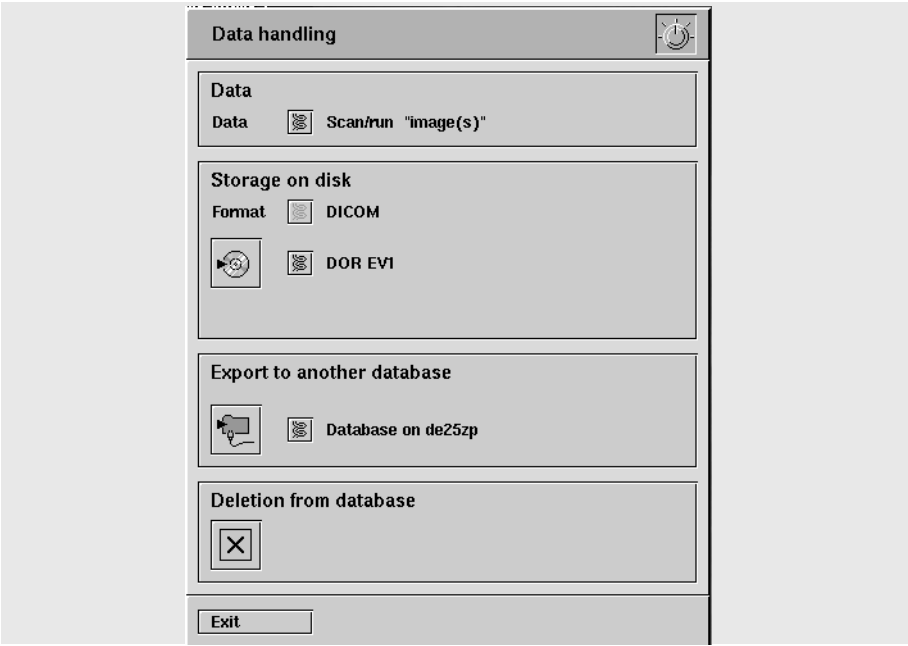
Fig. 9.2 'Data handling' window

2   In the 'Data' group field, select the examination to be edited.

3   Select the required function and confirm the query which appears.

Function	Application	
Data		
	Choose image or entire examination	9-5
Storage on disk		
Format	Select format: DICOM	
	Select disk drive	
	Start writing the CD	
Export to another database		
	Select target database	
	Start transfer	
Deletion from database		
	Delete selected examination	
Exit	Close window	

Function	Application

9.2   Calling up data handling

You can call up the 'Data handling' application from all other applications.

Calling up data handling

1   Click this symbol button.

•   The following window appears.
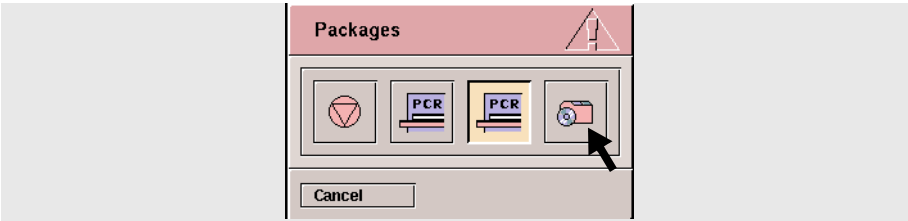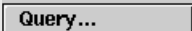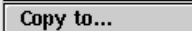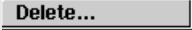
Fig. 9.3 'Packages' window

2   Click this symbol button.
•   The following window appears.
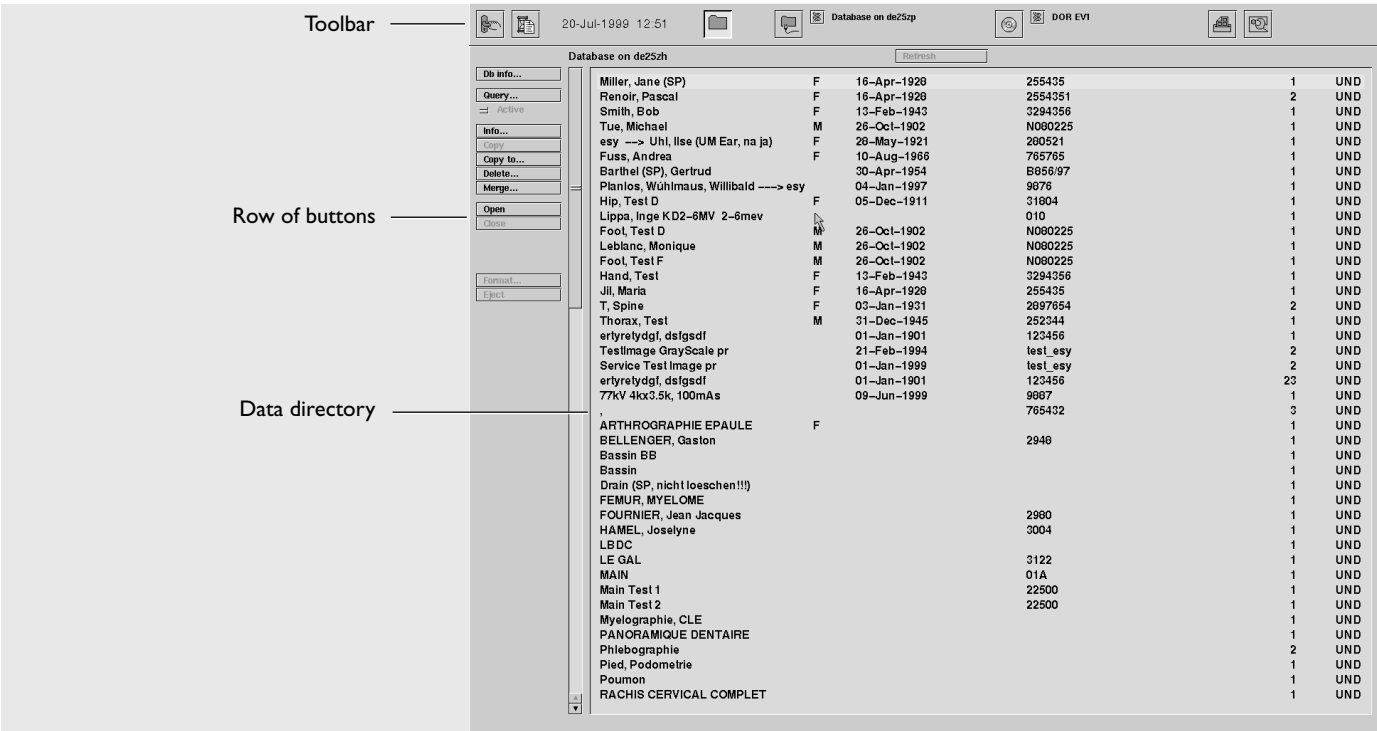
Fig. 9.4 'Data handling' application

Function	Application	Function	Application
Toolbar		**Row of buttons**	
	Select applications	Db info...	Make data base settings (see page 9-29)
	Query status of processing jobs (see page 10-5)	Query...	Select query criteria for the local database (see page 9-10)
	Display data directory of internal hard disk or server	Active	Activate last query or switch back to complete directory
	Select and display data directories from external computer systems	Info...	Edit examination data (see page 9-18)
	Select and display the data directory of an optical disk or CD	Copy	Copy examinations between displayed data directories (see page 9-22)
	Print marked examinations using print protocols (see page 8-17)	Copy to...	Transfer examinations with choice of format (see page 9-24).
	Service functions	Delete...	Delete marked data levels manually (see page 9-31)
Refresh	Update display of data directory for a DICOM-conforming system	Merge...	Merge examinations of the same patient (see page 9-27)
		Open	Open marked data levels (see page 9-9)
		Close	Close marked data levels (see page 9-9)
		Format...	Format an optical disk
		Eject	Eject optical disk/CD
		Secure CD	Secure data on a CD (see page 9-35)

9.3   Displaying data directories

You can display the data directory of the internal hard disk/server and a second data directory from an external computer or storage system. The data directory of the internal hard disk/server always appears in the upper half of the window and that of another system appears below it. Each system has its own row of buttons to perform the functions.
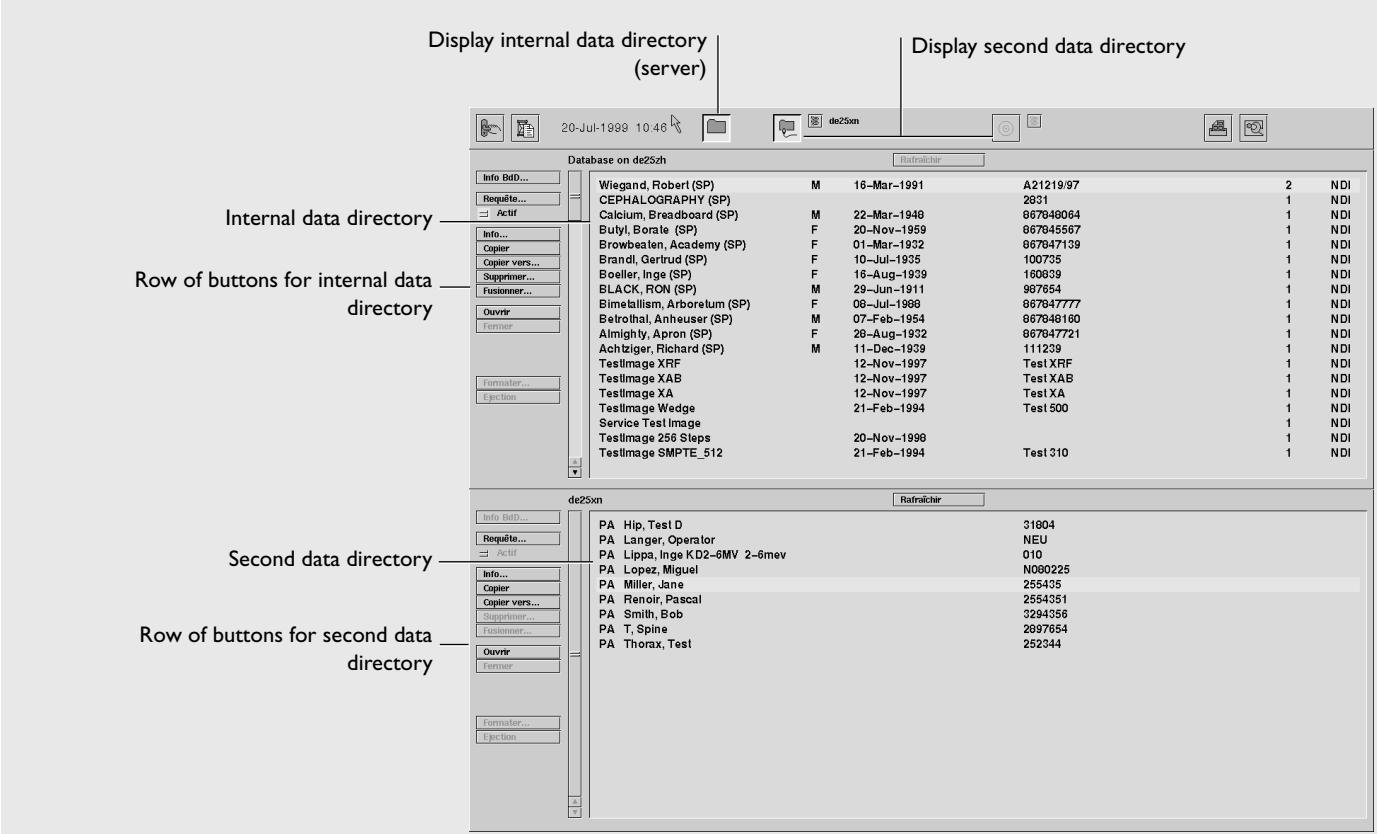
Fig. 9.5 Display of two data directories

If two data directories are displayed, you can then use the 'Copy' buttons to transfer marked examinations. For further information on this topic refer to the section „Performing the 'Copy' function" on page 9-22.

9.4   **Opening/closing data levels**

The examinations included in a data directory are arranged hierarchically. Overall five data levels can be distinguished through indentation:

1. Patient level
2.   Study level
3.   Examination level
4.   Series level
5.   Individual image level

Fig. 9.6 Data levels in the data directory

Opening/closing data levels

1 By clicking with the mouse, mark the data level that you would like to open or close.

2 In the row of buttons, click on 'Open' or 'Close' repeatedly until the required data level has been opened/closed.
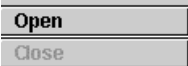
You can open/close several folders at the same time if you mark these beforehand.

9.5   Querying the local database

You can restrict or extend the display in the data directory by entering various query criteria. This process is known as a query. A query includes an assignment criterion or a combination of various assignment criteria and can be saved for repeated application.

Querying the database

Query...

1   Click 'Query' in the row of buttons.

• The following window appears.

Fig. 9.7 Query

N O T E   *No distinction is made between upper and lower case letters.*

2   Select the required criteria and select a command in the row of buttons at the bottom.

Function	Application
Query selection ▨	Select stored queries
Patient	Group field for entry of patient's data
Study	Group field for entry of study data
Examination	Group field for entry of examination data
Confirm	Apply query, window is hidden
Apply	Apply query, window stays on-screen
Cancel	Cancel procedure
Reset	Reset changes to previous setting
Save...	Save query
Delete...	Delete selected query under 'Query selection'
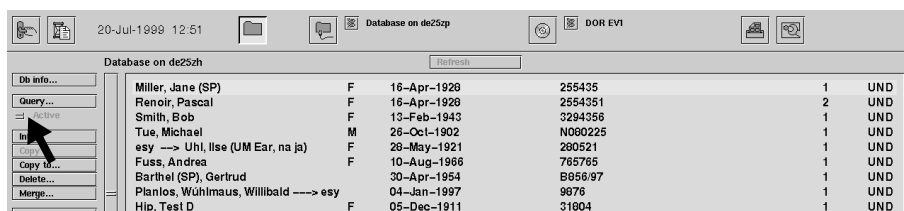
9.5.1   Application examples

In the following, three practical application examples of the query function are described.

Chronological sorting

You can sort the data directory according to the date the examinations were received so that the most recently transferred examination appears in the first line. To do this, select under 'Sort according to' the criterion 'Time received' and save this setting if necessary. Under 'Query selection', you can call up a stored criterion.

To switch back to the default display, click on 'Active'. Clicking again on 'Active' switches back to the previous query.

Fig. 9.8 8 'Active' button

You should delete stored query criteria which you no longer require.

Sorting according to image type

You can have only specific examination types (modalities) displayed. To do this select the modality under 'Select criteria' in the 'Examination' group field, and store this setting if necessary. Under 'Query selection', you can call up the stored criterion.

Query about a patient

To check whether the examination of a new patient has been received, enter his/her name in the 'Patient' group field (or just the initial letters) and store this query if other examinations are still expected. In addition, you can enter the date of the examination if you would only like to display specific examinations.

At a later point in time, call up the stored query again to check whether further examinations have been received. You can change the query criteria before renewed application, for example by limiting the modality, or extending the query to earlier examinations.

9.6   Marking/unmarking data levels

Most functions in 'Data handling' are applied to selected data levels which have been previously marked with the mouse. You can mark individual data levels with the help of various techniques.

9.6.1   Left mouse button
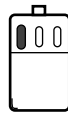
Clicking

By clicking with the left mouse button, you can make an exclusive selection.

Smith, Bob	M	04-Jan-1956	123654789	1	NDI
Study	24-Jul-1998			1	NDI
CR exam.	24-Jul-1998, 15:56:48	D. Klimt		1/2	NDI
Run 1	15:56:48			1	
Image 1	15:59:20			1	
Miller, Jane	F	24-Jan-1948	153755721	5	NDI
Sander, Jil	F	12-Jul-1963	456344573	3	NDI
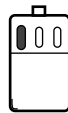
You can **unmark** several marked data levels by clicking outside the marking.
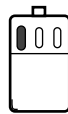
Dragging

By dragging with the left mouse button, you can mark several data levels listed one after the other in the data directory.

Smith, Bob	M	04-Jan-1956	123654789	1	NDI
Study	24-Jul-1998			1	NDI
CR exam.	24-Jul-1998, 15:56:48	D. Klimt		1/2	NDI
Run 1	15:56:48			1	
Image 1	15:59:20			1	
Miller, Jane	F	24-Jan-1948	153755721	5	NDI
Sander, Jil	F	12-Jul-1963	456344573	3	NDI

9.6.2   Centre mouse button
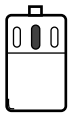
Clicking

By clicking with the centre mouse button, you mark individual data levels which are not listed one after the other in the data directory.

Smith, Bob	**M**	**04-Jan-1956**	**123654789**	**1**	**NDI**
Study		**24-Jul-1998**		**1**	**NDI**
CR exam.		**24-Jul-1998, 15:56:48**	**D. Klimt**	**1/2**	**NDI**
Run 1		**15:56:48**		**1**	
Image 1		**15:59:20**		**1**	
Miller, Jane	**F**	**24-Jan-1948**	**153755721**	**5**	**NDI**
Sander, Jil	**F**	**12-Jul-1963**	**456344573**	**3**	**NDI**

You can **unmark** individual data levels by clicking with the centre mouse button on a marked data level.

Smith, Bob	**M**	**04-Jan-1956**	**123654789**	**1**	**NDI**
Study		**24-Jul-1998**		**1**	**NDI**
CR exam.		**24-Jul-1998, 15:56:48**	**D. Klimt**	**1/2**	**NDI**
Run 1		**15:56:48**		**1**	
Image 1		**15:59:20**		**1**	
Miller, Jane	**F**	**24-Jan-1948**	**153755721**	**5**	**NDI**
Sander, Jil	**F**	**12-Jul-1963**	**456344573**	**3**	**NDI**

9.7   Information in the data directory

Information appears in the lines of the data directory regarding the respective data level and its contents. On the patient, study and examination levels, general data appears, while on the series and image level, there is examination-specific information which depends on the radiography system on which the examination was performed.

9.7.1   Patient level

On the patient level, patient data and DICOM status information appears. The following is an example:

1	2	3	4	5	6
Smith, Bob	M	15-Jan-1956	126544999	2	UND

Explanations

1 Last name of the patient, first name
2 Sex: W = female, M = male (sex unknown is not displayed)
3 Date of birth of the patient
4 Patient number (ID)
5 Number of studies contained in the patient folder
6 DICOM statuses:
   UND = Undicated
   DIC = Dictated
   TRN = Transcribed
   APP = Approved

9.7.2   Study level

On the study level, information regarding the study and the reporting physician appear. The following is an example:

1	2	3	4	5	6
Study	34532	20-Jan-1999	D. Lind	2	UND

Explanations

1 Indication of the study level
2 Exposure no. (study access number)
3 Date of the study
4 Reporting physician (evaluating physician)
5 Examinations contained in the study
6 DICOM statuses:
   UND = Undicated
   DIC = Dictated
   TRN = Transcribed
   APP = Approved

9.7.3   Examination level

On the examination level, information regarding the type of examination and the performing physician appear. The following is an example:

1	2	3	4	5	6
CR exam.	Thorax	20-Jan-1999, 15:58:48	D. Lind	3/5	UND

Explanations

1 Modality
2 Examination
3 Examination date/examination time
4 Performing physician
5 Number of the series/number of images
6 DICOM statuses:
   UND = Undicated
   DIC = Dictated
   TRN = Transcribed
   APP = Approved

9.7.4   Image series level

On the image series level, examination-specific information appears. The following is an example:

1	2	3	4	5	6
Run 1	R/F	15:28:56	–	12	–

Explanations

1 Series number
2 Examination type (modality)
3 Examination time
4 –
5 Number of images
6 –

9.7.5 **Individual image level**

On the image level, image-specific information and, if applicable, the respective exposure parameters are displayed.

CR images

The following is an example:

1	2	3	4	5	6
Image 1	–	15:28:56	–	2000 x 2000	–

Explanations

1 Image number ('Image 0' is used to indicate all the images that have been transferred more than once from the plate reader. 'Run 9999' is used to indicate all the composite images.)
2 –
3 Exposure time
4 –
5 Matrix size
6 –

9.8 Querying/editing data

With the help of the following function, you can change patient and examination data or add a comment to the data record. Furthermore, you can protect individual patient folders from automatic deletion and look at the various statuses which indicate the deletion conditions that have already been fulfilled for every data level.

Editing examination data

| Open |

1 Mark the data level on which you would like to edit. If you would like, for example, to enter a comment on the examination level, then you must open the patient file by repeated clicking on 'Open' until you reach the examination level and mark the examination.

| Info... |

2 Click this button in the row of buttons.
  • The following window appears.

Fig. 9.9 Examination information

3 Enter the required data and click 'Confirm'.

Functions	Application
Patient group field	
Entry fields 'Name' to 'Registration'	Change/supplement information if necessary
Protected	Activate if this patient file is to be protected against automatic deletion
Expired	Display of the status 'Term of protection expired' (see page 9-29)
Printed	Display of the status 'Printed' (see page 9-29)
Stored	Display of the status 'Stored' (see page 9-29)
Dictated	Display of the DICOM status 'Dictated'
Approved	Display of the DICOM status 'Approved'
Archived	Display of archiving status
Study group field	
Entry fields 'Study date' to 'Comment'	Change/supplement information if necessary
Statuses 'Expired' to 'Archived'	See 'Patient' group field
Examination group field	
Entry fields 'Modality' to 'Comment'	Change/supplement information if necessary
Statuses 'Expired' to 'Archived'	See 'Patient' group field

9.9   Transferring data

Your EasyVision workstation communicates via various network connections with other computer and storage systems. In the following sections you find out how you can transfer data to and from these systems.

9.9.1   Communication with computer and storage systems

The following table shows the functions on which the data exchange with other systems is based.

		Images		Dd[1]	
Computer systems	**send**	**retrieve**	**display**[2]	**display**	**Remarks**
EasyVision RAD server	yes	yes	yes	yes	Client/server communication (corresponds to the internal data directory)
EasyVision in a network group	yes	yes	no	yes	Networking of EasyVisions of the same type and software versions, possibly with coupled radiography systems (DSI systems).
Any DICOM partner	yes	yes[3]	no	yes[3]	For example, archive, viewing stations, radiography systems, other EasyVisions; use 'Refresh' to update the display.
External systems	yes	no	no	no	Non-DICOM-conforming external systems

		Images		Dd[1]	
Storage systems	**send**	**retrieve**	**display**[2]	**display**	**Remarks**
Optical disks, Compact Disk	yes	yes	no	yes	

1) Data directory

2) Without transfer procedure to the internal hard disk

3) Dependent on DICOM Conformance Statement

9.9.2   EasyVision communication functions

The following table shows the functions with which the data exchange can be performed.

Computer systems	Dd[1) display	Images send	retrieve	Remarks
EasyVision RAD server		–	–	Client/server communication
EasyVision in a network group		'Copy' or 'Copy to'	'Copy' or 'Copy to'	Networking of EasyVisions of the same type and software versions, possibly with coupled radiography systems (DSI systems).
Any DICOM partner		'Copy' or 'Copy to'	'Copy' or 'Copy to'	For example, archive, viewing stations, radiography systems, other EasyVisions; use 'Refresh' function.
External systems	–	'Copy to'	–	Non-DICOM-conforming external systems

Storage systems	Dd[1) display	Images send	retrieve	Remarks
Optical disks, Compact Disk		'Copy' or 'Copy to'	'Copy' or 'Copy to'	Format selection only with 'Copy to'; use 'Refresh' function if several users have access.

1) Data directory

9.9.3   # Performing the 'Copy' function

Using the 'Copy' function, you can exchange data between your workstation and various computer and storage systems in both directions (see page 9-21). To do this, the source and destination databases must be displayed on the screen.

Performing the 'Copy' function

1   Open the internal database (server) if this is not yet displayed.

		20-Jul-1999 12:51			Database on de25zp			DOR EV1		
Database on de25zh						Refresh				
Db info...		Miller, Jane (SP)		F	16–Apr–1928		255435		1	UND
Query...		Renoir, Pascal		F	16–Apr–1928		2554351		2	UND
Active		Smith, Bob		F	13–Feb–1943		3294356		1	UND

2   Select and open an external computer system

    – or –

2   select and open a storage system.

If you have selected a DICOM-conforming computer system, a query window then appears. Enter the required query criteria (if necessary, use a wildcard [*]) and confirm the query. To display the entire data directory, press the Enter key without making any entries.

Fig. 9.10 DICOM 'Query' window

• The data directory of the computer or storage system appears in the lower half of the data handling.
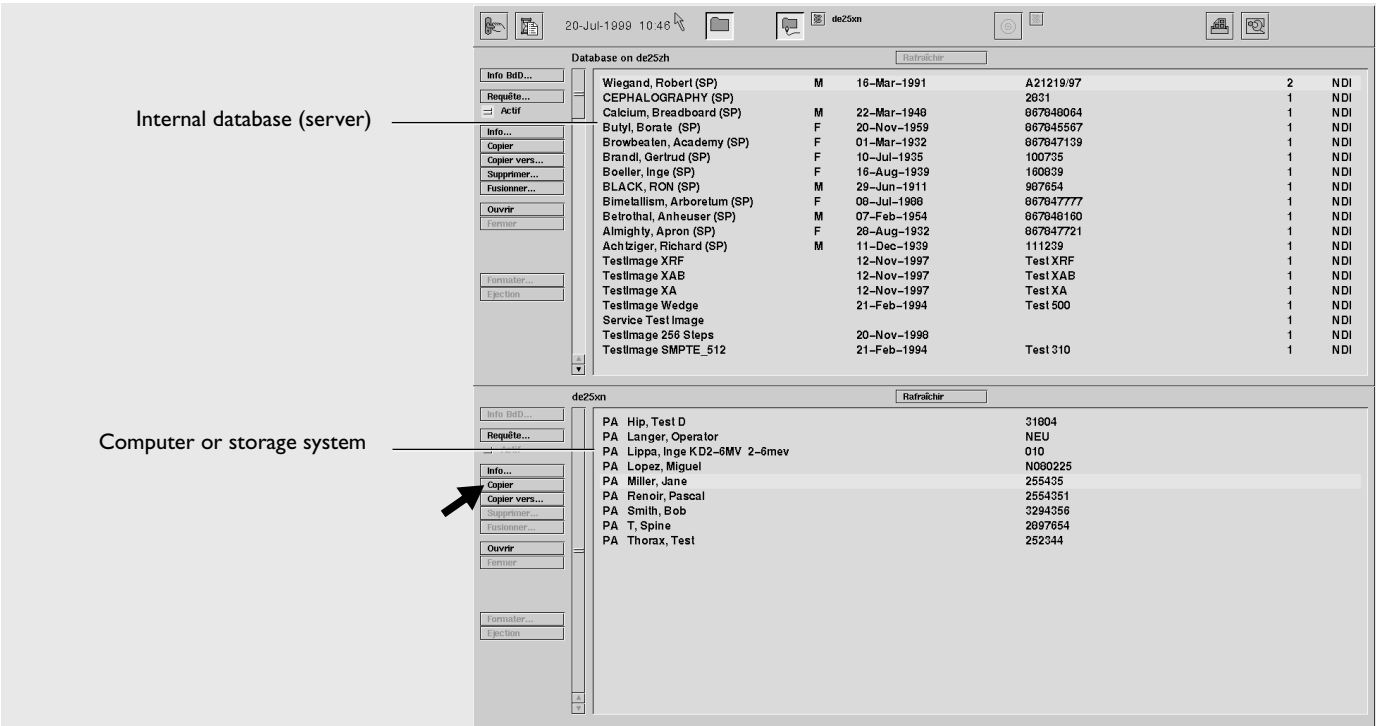
Fig. 9.11 Display of two data directories

N O T E   *If the data directory of a DICOM-conforming system has been displayed for a longer period of time, use the 'Refresh' to update the display. Through the access of other users, the status may have changed in the meantime.*

3   In the source directory, mark the patient/study/examination file that you wish to transfer (see page 9-13).

4   Click on 'Copy' in the row of buttons for the source database.
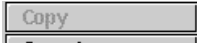
The marked examinations are transferred. You can check the transfer procedure. For further information on this topic refer to the section „Monitoring of processing procedures" on page 10-5.

9.9.4 ## Performing the 'Copy to' function

Using the 'Copy to' function, you can transfer data between your workstation and various computer and storage systems (see page 9-21). To do this, only the source database must be displayed on the screen. Select the target database from a special window.

⚠

DANGER

Storage in JPEG or TIFF formats may lead to a loss in quality due to data compression. Images stored in these formats must no longer be used to make a diagnosis.

Performing the 'Copy to' function

1 If necessary, open the internal database,

– or –

1 select and open an external computer system,

– or –

1 select and open a storage system.
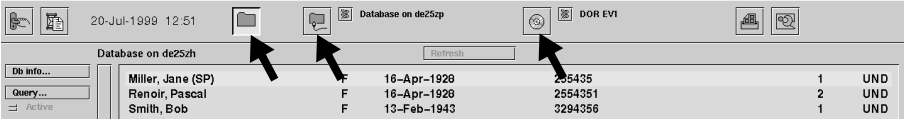
2 In the source directory, mark the patient/study/examination file that you would like to transfer (see page 9-13).

3 Click this button.

• The following window appears.

Destinations	Select required destination system
Export settings	Select compression factors for export
Default	Default	No data compression
Format	Select file format
DICOM	DICOM	DICOM format
	JPEG	PC formats
	TIFF	
Edit...	Adapt formats
Cancel	Cancel procedure
Confirm	Start transfer
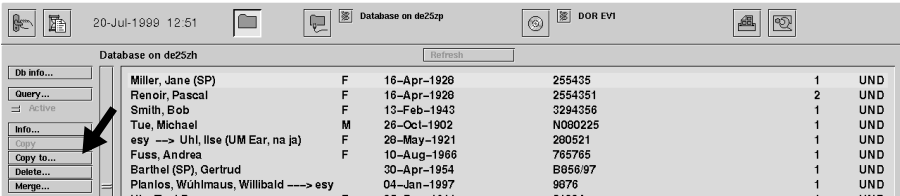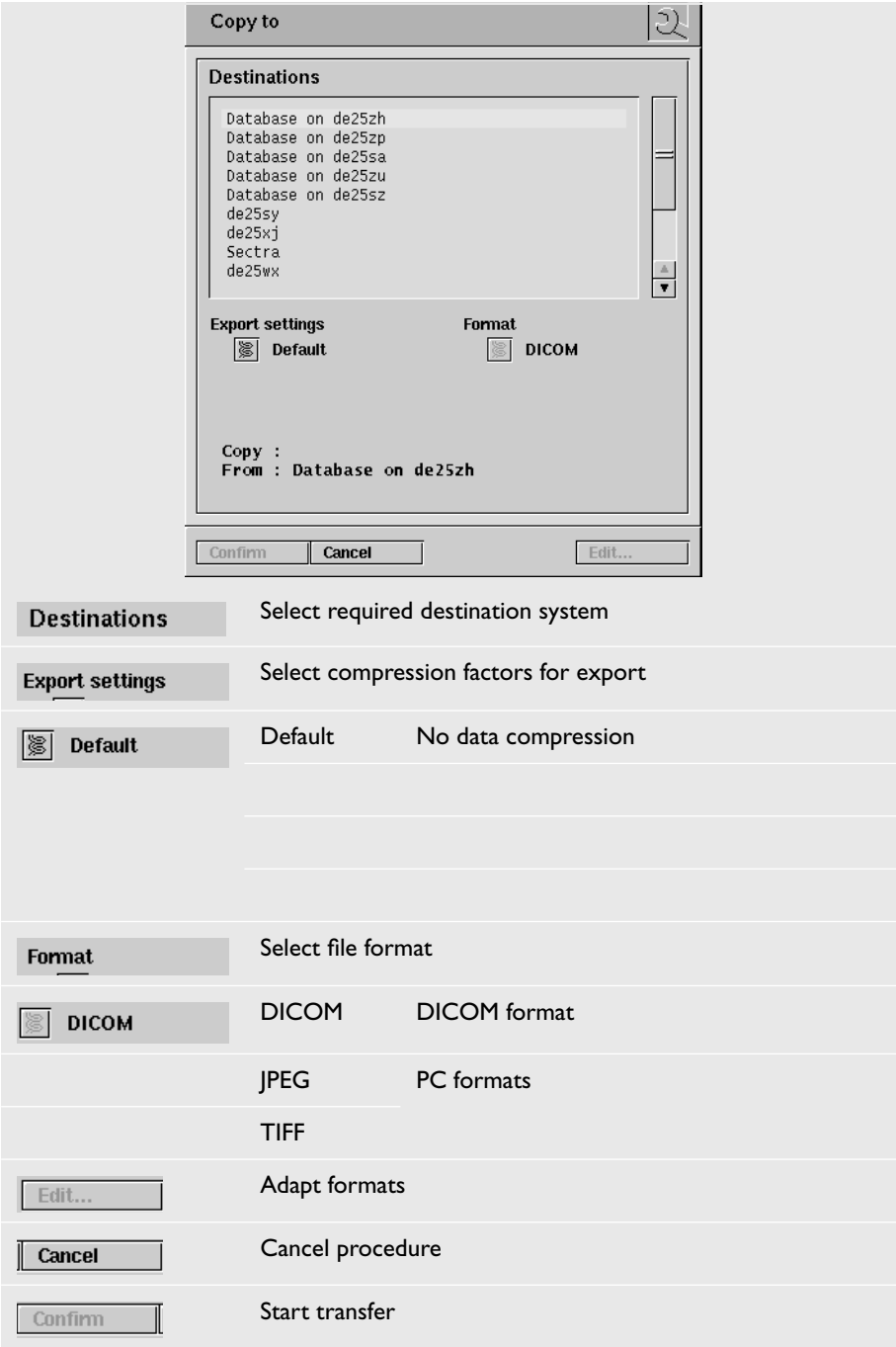
Fig. 9.12 Copy to window

Select an addressee and, if necessary, the export settings and the required format (see page 9-26).

4 Click 'Apply'.

The marked examinations are transferred. You can check the transfer procedure. For further information on this topic refer to the section „Monitoring of processing procedures" on page 10-5.

Information regarding the file formats

In the 'Copy to' window, you can use various file formats to store and transfer examinations. The following table explains their specific application purposes.

⚠

DANGER *Storage in JPEG, TIFF formats may lead to a loss in quality due to data compression. Images stored in these formats must no longer be used to make a diagnosis.*

File format	Application/Remarks
DICOM	Default format for communication between medical systems
JPEG	For PC applications; patient data will be lost
TIFF	For PC applications

9.10 Merging examinations

Normally, different examinations from one patient are automatically merged when entered into the local database. If the patient data do not completely agree, e.g. due a spelling error, the examination must then be merged manually.

⚠

DANGER   *If two patients have the same name, it may mistakenly lead to a false assignment of examinations. Therefore check, before merging, that all patient data agrees. Once folders have been merged, they cannot be separated again.*

Merging examinations

1   Mark the examinations and patient folders to be merged.

Merge...

2   Click this button.

• The following window appears.

Fig. 9.13 'Merge' window

3   Select the target folder, meaning that folder into which the other examination should be transferred.

4   Click 'Confirm'.

The selected folders are merged.

9.11   Deleting/archiving images

The EasyVision RAD uses an **automatic delete mechanism** which ensures that enough space is always available on the hard disk for new examinations. In individual cases, examinations can also be deleted manually.

9.11.1   Automatic deletion

Automatic deletion always occurs when new examinations are received and there is no longer any free hard disk space available. Only complete patient folders with all their contents are deleted, and not just individual sections. They are deleted when the deletion conditions for all the studies and examinations contained in the folder have been fulfilled. The sequence of deletion depends on when the patient folders were received, i.e. the patient folder stored for the longest time is deleted first.

If there is not enough space and no patient folders whose deletion conditions have been fulfilled, an error message then appears in which the transfer of new examinations is refused. You must create space on the hard disk through manual deletion.

N O T E   *Install an additional hard disk in your workstation if this occurs frequently.*

9.11.2   # Setting the deletion conditions

N O T E   *On workstations without an independent database (clients), the functional feature described here is deactivated.*

You can change the deletion conditions for incoming patient folders and save the new settings permanently, or temporarily override only the basic settings.

Setting the deletion conditions

1   Click this button.

•   The following window appears.
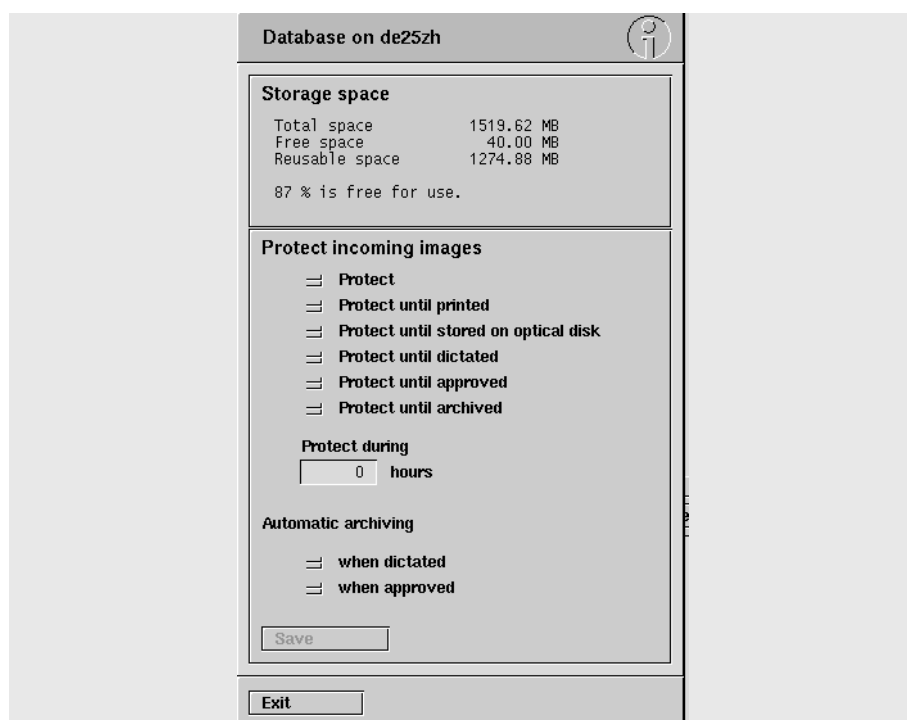
Fig. 9.14 Database window

2   Activate the required delete conditions (see table on the next page) and click on 'Save' to store the new settings.

Storage space	(see page 10-4)
Protect incoming images	
⊒ Protect	General deletion protection until manual deletion (automatic deletion inhibited)
⊒ Protect until printed	Protected until printed
⊒ Protect until stored on optical disk	Protected until stored on an optical disk or CD
⊒ Protect until dictated	Protected until the 'dictated' (DIC) status has been reached
⊒ Protect until approved	Protected until the 'approved' (APP) status has been reached
⊒ Protect until archived	Protected until automatically archived
Protect during [0] hours	General term of protection. Protected until all activated deletion conditions have been fulfilled and at least for the period of time indicated here. Complete entry by pressing the Enter key.
Automatic archiving	
⊒ when dictated	Automatic archiving, when the 'dictated' (DIC) status has been reached
⊒ when approved	Automatic archiving, when the 'approved' (APP) status has been reached
Save	Save the settings
Exit	Close window

<p style="text-align:right">**9.11.3**</p>

Manually deleting examinations

If there is not enough space available on the internal hard disk/server hard disk, you must manually delete examinations which are no longer required.

⚠

DANGER   *Once examinations have been deleted, they cannot be restored. Before deletion, make certain that these are really no longer required.*

Deleting examinations

1   In the data directory, mark the examinations to be deleted (see page 9-13).

Delete...

2   In the row of buttons at the left of the internal database, click on 'Delete'.

- A query appears.

3   Confirm the query.

The marked data levels are deleted.

9.12 Working with optical disks

With the help of optical disks, you can transfer examinations between various computer systems if this is not possible via the clinic network. If you archive examinations on optical disks, you save hard disk space.

9.12.1 Inserting an optical disk

1   Place the optical disk in the loading tray of the disk drive (see page 3-5).
    • The storage disk symbol appears clearly when the optical disk is ready to use.

2   Click this symbol button.

🖿 🗎	20-Jul-1999 12:51	📁	📁 🗒 Database on de25zp	⊚ 🗒 DOR EV1	🏭 📷

Database on de25zh				Refresh	
Db info...	Miller, Jane (SP)	F	16–Apr–1928	255435	1	UND
Query...	Renoir, Pascal	F	16–Apr–1928	2554351	2	UND
Active	Smith, Bob	F	13–Feb–1943	3294356	1	UND
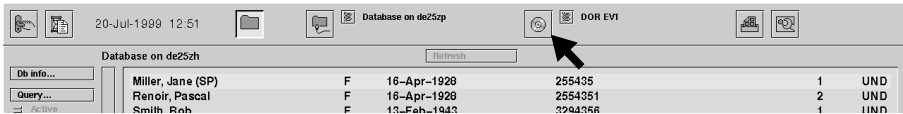
• The data directory for the optical disk is displayed in the lower half of the data handling.

9.12.2 Ejecting an optical disk

1   Click on this symbol button,

Ouvrir	PA Thorax, Test	252344
Fermer		
Formater...		
Ejection		

– or –
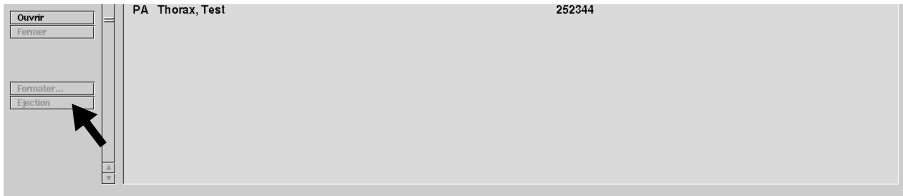
1   press the eject button on the disk drive.
    • The optical disk is ejected.

9.12.3 Retrieving/storing examinations

To load and store examinations on optical disks, the 'Copy' and 'Copy to' functions are used (see page 9-22).

9.12.4   # Formatting an optical disk

New optical disks must be formatted before initial use. EasyVision automatically recognises non-formatted optical disks.

Formatting optical disks

1   Place the optical disk in the loading tray of the disk drive.
    • The following window appears.
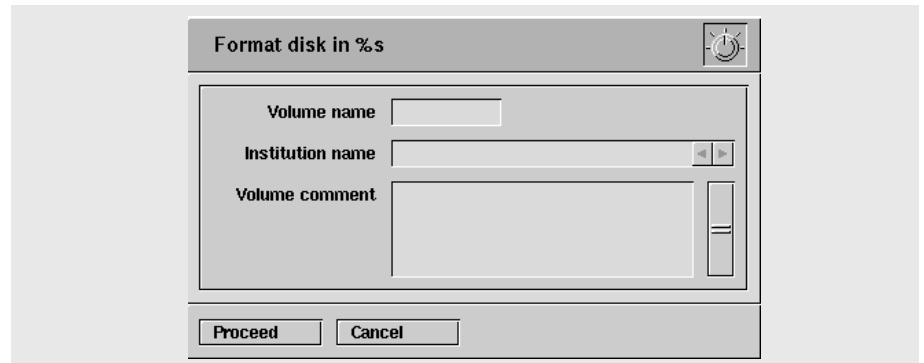
Fig. 9.15 'Format optical disk' window

2   The 'Volume name' entry field is an obligatory entry field and must always receive an entry.

N O T E   *In the 'Volume name' field, use a maximum of 8 letters and no spaces.*

3   Click 'Proceed' and confirm the process in the query window.

The optical disk is formatted. During this procedure, the display in the row of buttons flashes.

9.12.5   # Deleting an optical storage disk

To delete an optical storage disk, proceed in the same way as for formatting.

9.13   Working with CDs

You can store examinations on writable CDs in various file formats or copy from a CD to the internal hard disk. You can monitor the transfer procedures with the help of the status function.

9.13.1   Inserting a CD

1   Place the CD in the tray of the CD drive (see page 3-4).
    • The storage disk symbol appears clearly when the CD is ready to use.

2   Click this symbol button.
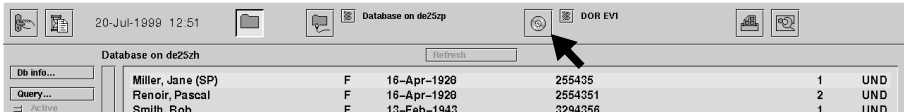
    • The CD data directory is displayed in the lower half of the data handling.

9.13.2   Ejecting a CD

NOTE   *If you copy examinations onto the CD, you must fix the data on the CD before ejecting.*

1   Click 'Eject' in the row of buttons for the CD,

    – or –
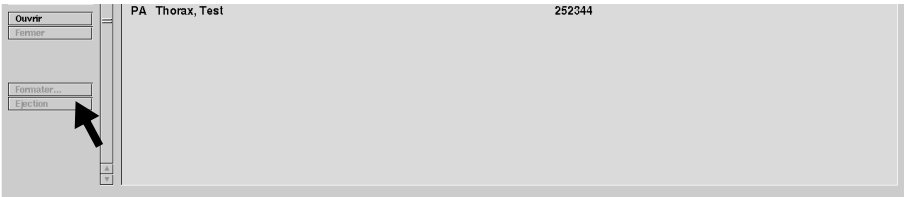
1   press the eject button on the CD drive.
    • The CD tray opens. Remove the CD and close the CD tray.
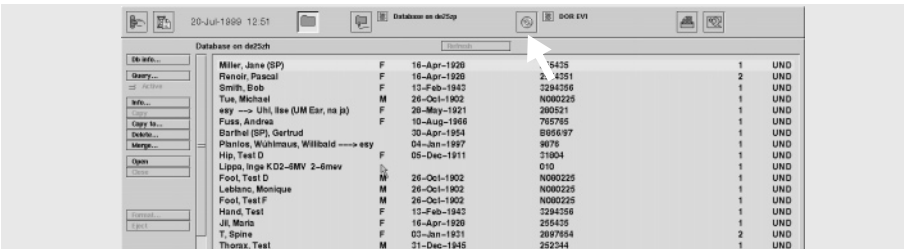
    • The CD data directory is displayed in the lower half of the data handling.

9.13.3   Writing images to CD `Option`

N O T E
- *To avoid data loss, only use high-quality brand name CDs.*
- *A CD can be written in several sessions. At each session at least 20 MB of storage space is used. Philips recommends writing the CDs with large units of data.*
- *The storage space needed to save the data and the storage space available on the CD are shown in the window 'Copy to' (see Fig. 9.12).*
- *It is not possible to save data with the same patient ID but different patient names. Therefore, for each patient whose data is to be saved, it is necessary to enter a unique patient ID.*

EasyVision RAD supports the following formats:

- DICOM
  The standard format for medical images with the largest data range. This format can be reimported into the EasyVision RAD database.
- JPEG, TIFF
  Data formats for PC applications with quality and data losses. These data formats cannot be reimported into the EasyVision RAD database.

Writing images to CD
Images can be written to a CD in several sessions. The procedure is similar to data transfer between databases:

- Use the 'Copy' function to save images in the DICOM format. For further information on this topic refer to the section „Performing the 'Copy' function" on page 9-22.
- Use the function 'Copy to' to use other data formats, for example TIFF. For further information on this topic refer to the section „Performing the 'Copy to' function" on page 9-24.

9.13.4   Transferring CD data

When you place a DICOM-compatible CD in the CD drive, EasyVision reads the contents list. You can transfer the data displayed from the CD to the internal EasyVision RAD database.

N O T E   *PC formats (JPEG/MPEG/TIFF) can not be imported into the database.*

Copying from CD
- Use the 'Copy' function to transfer CD data. For further information on this topic refer to the section „Performing the 'Copy' function" on page 9-22.

9.13.5   # Calling up CD information

You can call up a window with information about the CD which is currently inserted.

1   Click the button 'Db info'.
   • The following window appears:

CD Recordable on de25qi

CD name	EV_VOLUME		Free capacity	137534	kB
Creation time	20-Dec-2002 13:32:00		Tracks left	83	

Access rights
Read-write

History
Sessions   16
Current session   16
Select session   0

Status
Is edited   n
Needs fixation n
Is writing   n
Is fixating   n

Exit

CD name	Standard name which is assigned by the system and cannot be edited by the user
Creation time	Date and time of the first session
Free capacity	Displays the remaining storage capacity on the CD
Tracks left	Each CD has a maximum of 99 tracks. One track is required in each session regardless of the amount of data which is to be saved.
Access rights	Displays the current access rights for the selected work session
Status	Displays status messages for the writing processes and CD.
History	Group field for displaying and selecting work sessions
	Nummer of sessions — Displays number of sessions written to date
	Current session — The active session is displayed here
	Previous session — Switch display back to previous sessions
	Reset — Reset group field history to former state

Abbildung 9.16   'Writable CD'

This window provides all available CD information.

9.13.6   # Selecting previous session

You can display the data from already written sessions. Access rights for previous sessions are always limited to reading only as the data cannot be deleted.

Selecting previous session

• In the group field 'History' click the button 'Select session'. By repeatedly clicking on this key you are able to switch back to earlier sessions, session by session.

In the data directory the written data from each selected session is displayed. You can switch back directly to the current session by clicking the 'Reset' button.

9.14   Service functions

N O T E   *The Service functions are generally reserved for the Philips Customer Service.*

Users must only use Service functions to call up test images.

9.14.1   Calling up test images

With the help of the stored test images, you can check the calibration of the system.

Calling up test images

1   Click this symbol button.
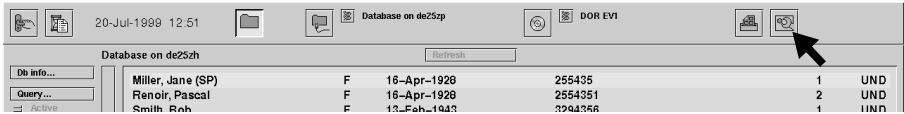
• The following window appears.
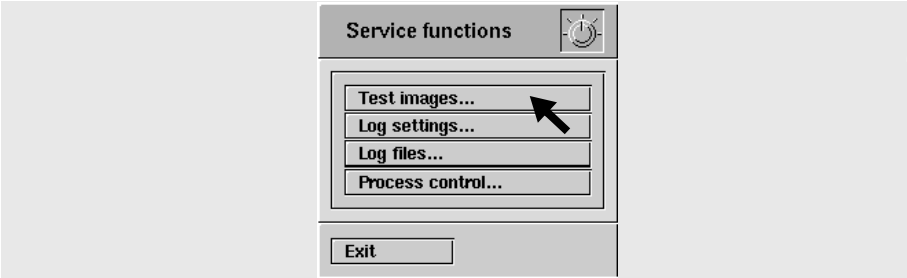
2   Click 'Test images'.

• The following window appears.

Printer test images	Test images for checking calibration
Load	Loading test images to an internal database
Service test images	Save images for communication with the Service
Load	Load a marked image in the data directory
Save	Save a loaded image
EasyVision CD images	Display supplied demo images on CD
Load	Load images on inserted demo CD
Eject	Eject demo CD
Development test images	Reserved for Philips Customer Service
File name	
Load	Do not use
Exit	Exit procedure

Fig. 9.17 'Test images' window

3 Select the required test images by clicking 'Load' and then click 'Exit'.
• The test images are loaded into a directory on the internal hard disk (server) that is not automatically deleted.

You can display or print the test images.

NOTE *If two CD drives are connected, the demo CD must be inserted in the standard drive. Do not use the CD writer for this.*

Chapter 10 System management 10-3

10 System management

In this chapter, you will find out how to control various system processes such as the processing of print and transfer jobs. In addition, a description is given of how to check the free storage capacity of the internal hard disk.
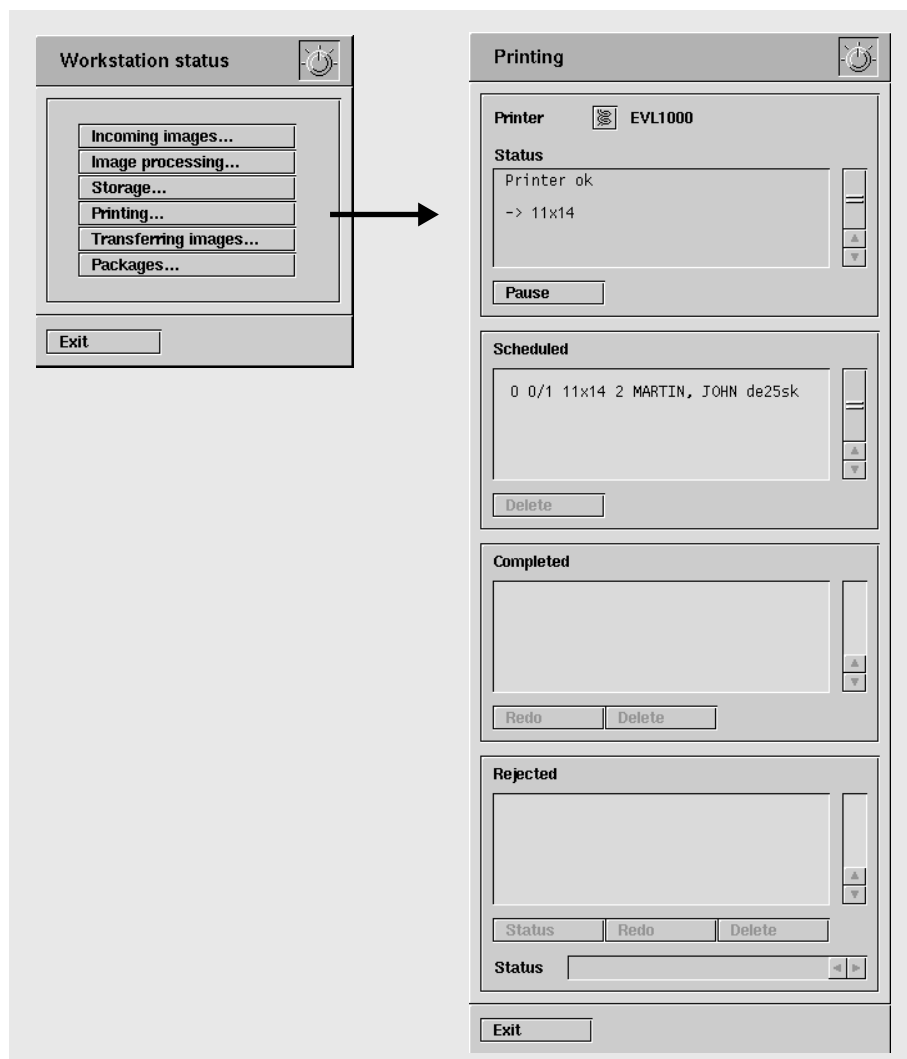
Fig. 10.1 'Printing' status function

10.1 Checking free storage capacity

You can call up the window shown below in the application 'Data handling'. The 'Storage space' group field contains information on available storage space in the local database. The local database is the area of the hard disk of your workstation intended for storage of images.

```
Database on de25zh                                    (i)

Storage space

   Total space            1519.62 MB
   Free space               40.00 MB
   Reusable space         1274.88 MB

   87 % is free for use.

Protect incoming images
        ⊐  Protect
        ⊐  Protect until printed
        ⊐  Protect until stored on optical disk
        ⊐  Protect until dictated
        ⊐  Protect until approved
        ⊐  Protect until archived

     Protect during
           0    hours

Automatic archiving

        ⊐   when dictated
        ⊐   when approved

     Save

  Exit
```

'Storage space' group field

Total space	Total storage space on the hard disk for the local database
Free Space	Free storage space on the local database
Reusable space	Storage space that can be deleted upon receiving new images since the deletion conditions of the images have been fulfilled.
% information	Available storage space in % (free + reusable storage space)

Fig. 10.2 Database window

N O T E   *The storage space listed under 'Reusable' is counted as free storage space since it is occupied by images whose deletion conditions have already been fulfilled. This storage space is not automatically deleted when the deletion conditions are fulfilled, but when new images are received at the local database. The size of the reusable storage space is thus dependent on the current data throughput of your system.*

10.2   Monitoring of processing procedures

The EasyVision RAD workstation carries out processing procedures, such as printing and transferring jobs, in the background. You can monitor, repeat or cancel these procedures. To do this, use the status function. The status function symbol flashes if a problem occurs during processing of a job.

Monitoring, repeating, cancelling a processing procedure

1   Click this symbol button.
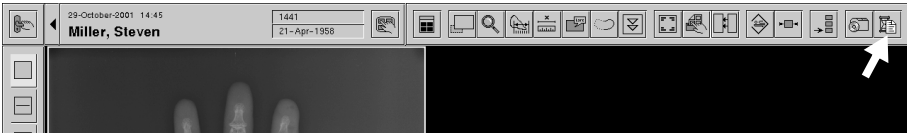
• The following window appears.

Incoming images...	Monitor incoming images from coupled radiography systems, from the image reader or other computer or storage systems (see page 10-6)
Image processing...	Monitor the processing of reconstructed overview images, e.g. Bolus Chase (see page 10-8)
Storage...	Manage manual/automatic storage of examinations on optical disks/CDs (see page 10-10)
Printing...	Manage manual/automatic print jobs (see page 10-12)
Transferring images...	Transfer jobs to other computer or storage systems (see page 10-14)
Packages	Manage storage space occupied by applications (see page 10-16)

Fig. 10.3 'Workstation status' window

2   Select the flashing category to find the error.
• The corresponding window appears.

10.2.1   # Checking incoming images

You can monitor incoming images which are transferred from other systems to your workstation.

Checking incoming images

1   Click 'Incoming images...' (see page 10-5).
   • The following window appears.
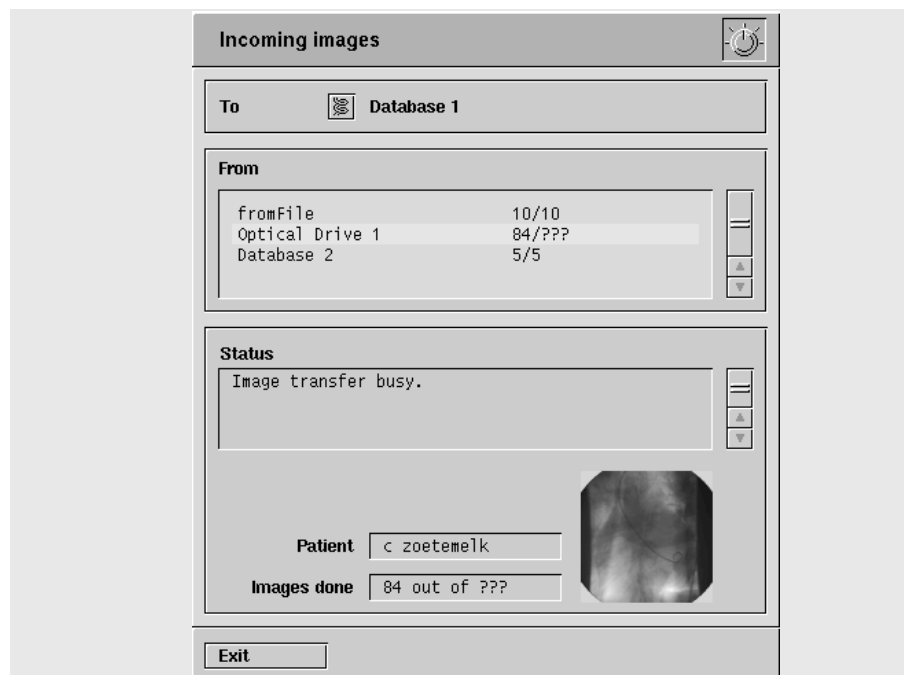
Fig. 10.4 'Incoming images' window

2   Select the destination and source of the incoming images and then check the status.

To	
Database 1	Select database for display of source
From	Display the originating system
5/12	5 of 12 images already transferred
Status	Display of status reports after selecting a source
Patient	Display of patient name in current procedure
Images done	Display of examinations already transferred and total number of examinations to be transferred in the current procedure
	Display of current incoming image
Exit	Close window

10.2.2   # Checking image processing

Image processing means arithmetic processes which are required for automatic reconstruction of overview images (e.g. Bolus Chase). You can monitor the progress of these procedures.
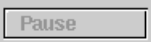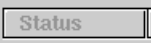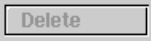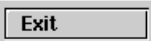
Checking image processing

1   Click 'Image processing...' (see page 10-5).
    • The following window appears.
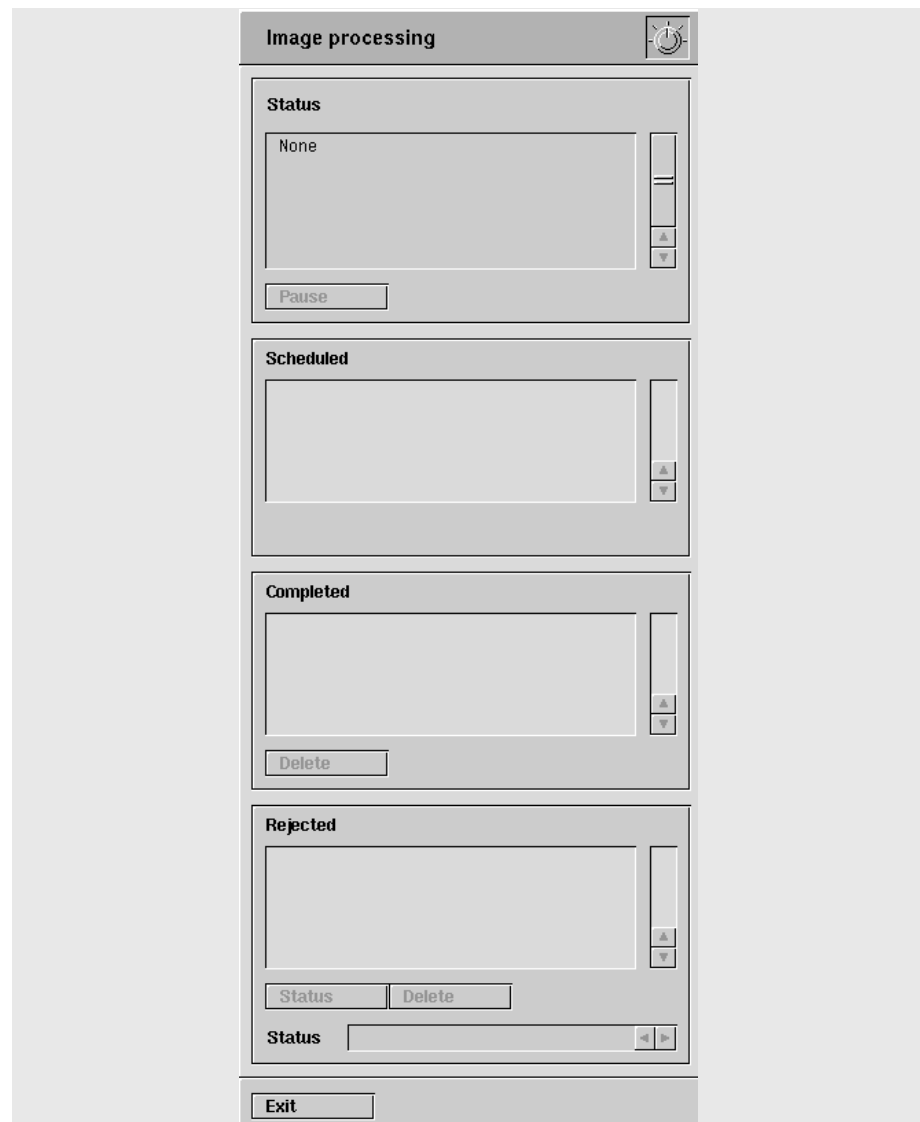
Fig. 10.5 'Image processing' window

2   If necessary, select an image processing job in the 'Rejected' field and then click 'Status' to receive information regarding the problem which has occurred.

Status	Display of status reports (mark job beforehand)
Pause	Interrupt/continue job
Scheduled	Display of jobs planned
Completed	Display of jobs performed
Delete	Delete performed job from the 'Performed' list
Rejected	Display of rejected jobs
Status	Query status reports
Delete	Delete job from the 'Rejected' list
Status	Display of status report
Exit	Close window

10.2.3   Managing storage procedures

You can monitor, repeat or cancel automatic or manual storage procedures on optical disks.
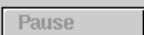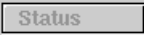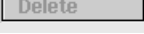
Managing storage procedures

1   Click 'Storage...' (see page 10-5).
   •   The following window appears.
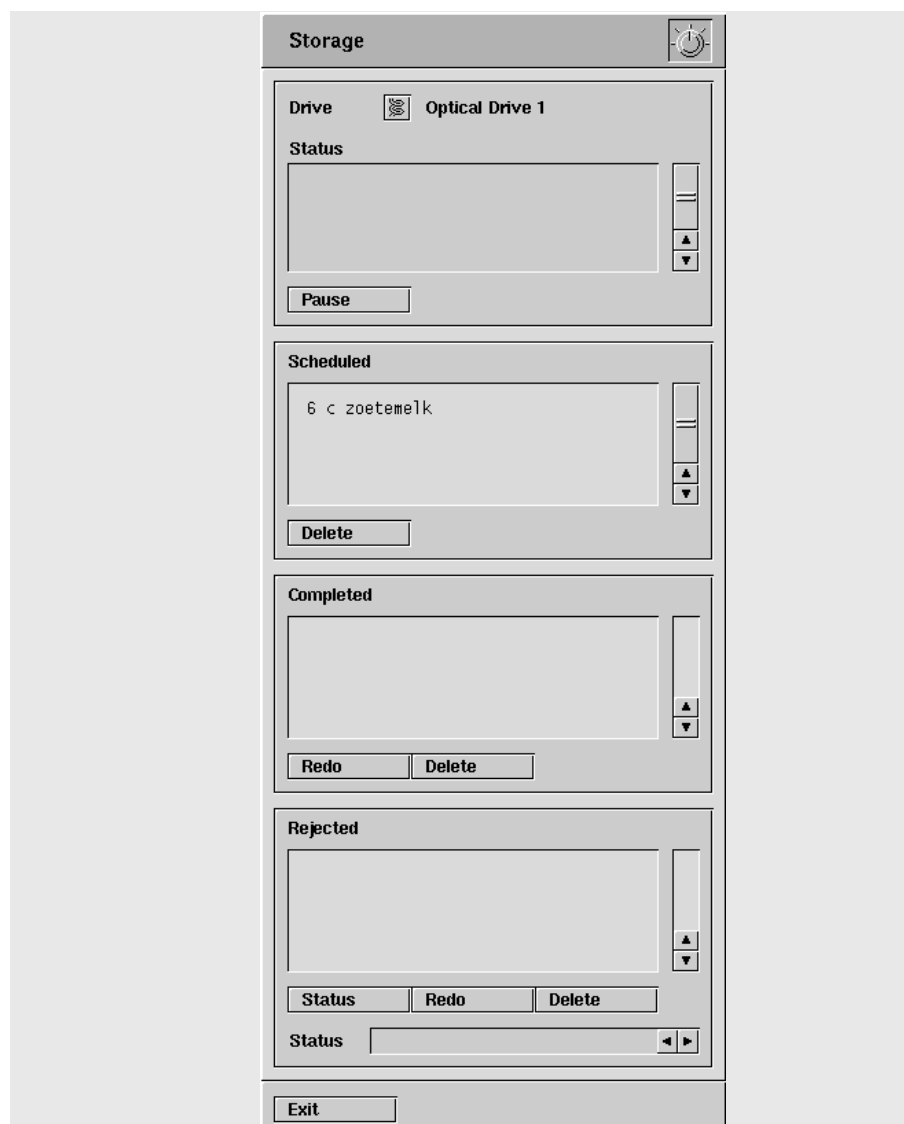
Fig. 10.6 'Storage' window

2   If necessary, click a storage job and select the required function.

▨ **Optical Drive**	Select drive for display of jobs
Status	Display of status reports (mark job beforehand)
Pause	Interrupt/continue job
Scheduled	Display of jobs planned
Delete	Delete planned job
Completed	Display of jobs performed
Delete	Delete performed job from the 'Performed' list
Redo	Repeat performed jobs
Rejected	Display of rejected jobs
Status	Query status reports on a job
Redo	Repeat rejected job
Delete	Delete job from the 'Rejected' list
Status	Display of status report
Exit	Close window

10.2.4   ## Managing print jobs

You can monitor, repeat or cancel automatic or manual print jobs on your workstation. The sequence of processing always depends on the time when the job is received. In a queue ('Scheduled' field), print jobs with the same print medium as the job currently in process are given preference.
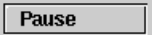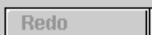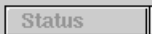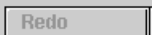
Managing print jobs

1   Click 'Printing...' (see page 10-5).
 • The following window appears.
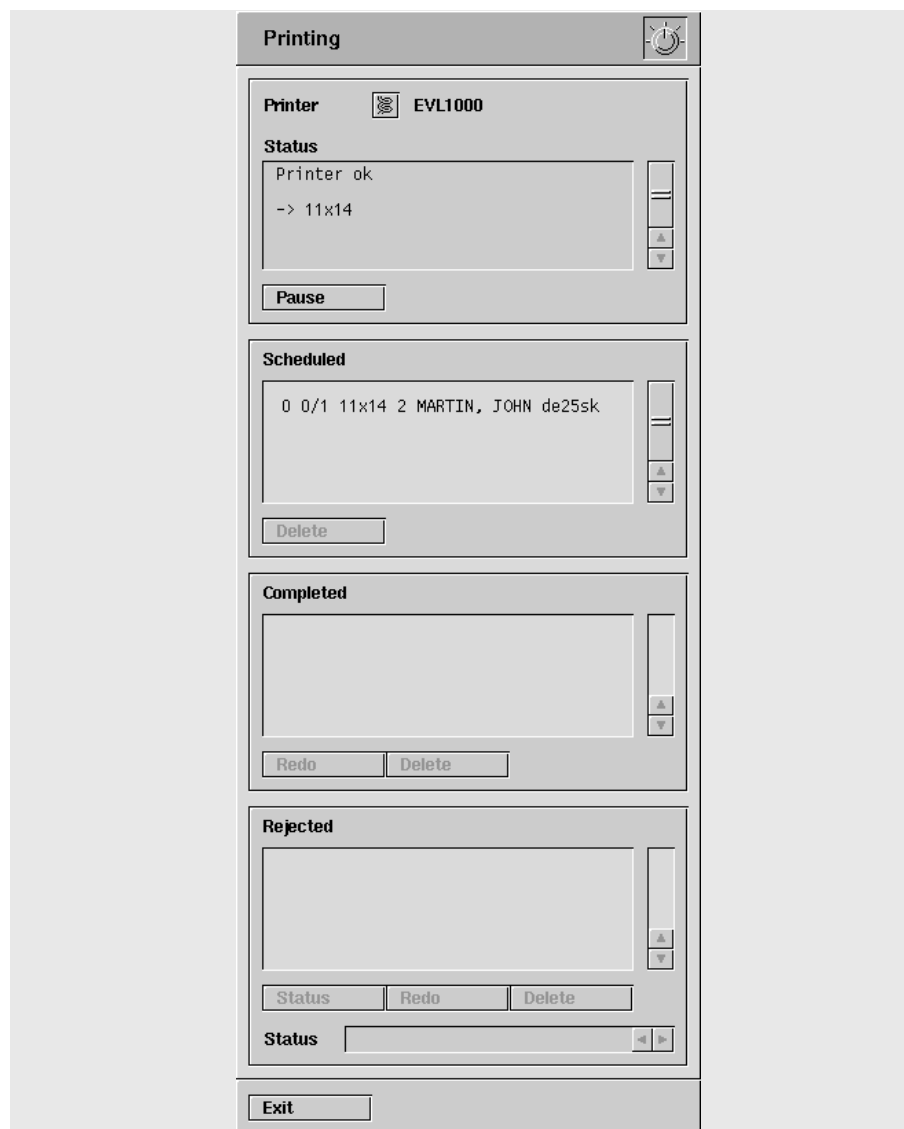
Fig. 10.7 'Printing' window

2   If necessary, click a storage job and select the required function.

Printer	
Printer [icon]	Select connected printer for display of jobs
Status	Display of status reports (mark job beforehand)
Printer OK	Printer is ready for operation
Pause	Processing interrupted, press 'Pause' button on screen or 'Pause' key on the keyboard
–> 8,5 x 11 paper	–> = Displayed medium available
?! 14 x 17 paper	'?!' = Displayed medium not available (e.g. cassette not inserted or empty)
Pause	Interrupt/continue job
Scheduled	Display of jobs planned
00/1 14 x 17 1 Name EV 1	Printed page, total pages, film format, consecutive number of the print job, patient name, name of workstation
Delete	Delete job from the 'Scheduled' list
Completed	Display of jobs performed
Redo	Repeat performed job
Delete	Delete performed job from the 'Performed' list
Rejected	Display of rejected jobs
Status	Display status reports for a rejected job
Redo	Repeat rejected job
Delete	Delete rejected job
Status	Display of status reports
Exit	Close window

10.2.5 # Managing image transfer

'Image transfer' signifies the sending of images from an EasyVision RAD computer to another computer system.. If images are sent in the reverse direction, meaning from another computer system to your workstation, you can check this procedure under 'Incoming images'.
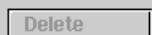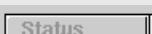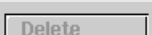
Managing image transfer

1 Click 'Image transfer...' (see page 10-5).
   • The following window appears.
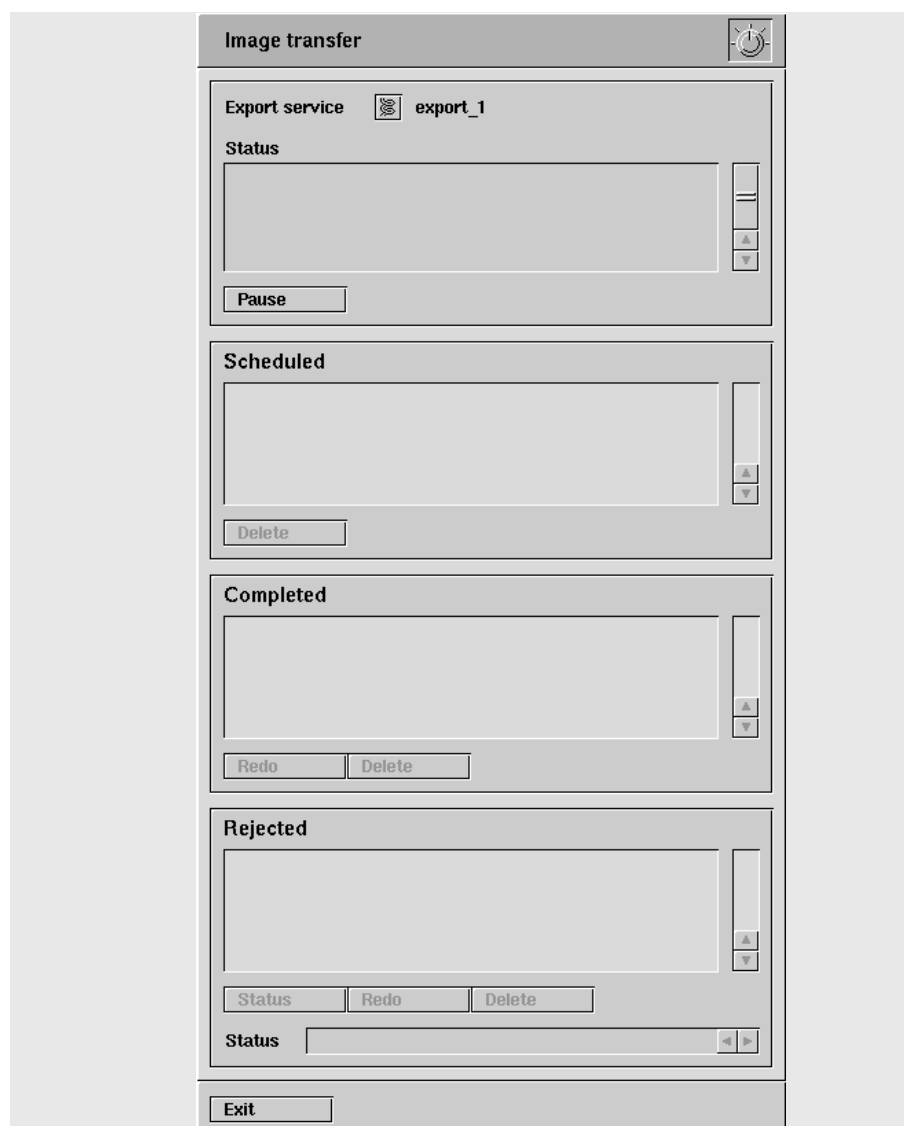
Fig. 10.8 'Image transfer' window

2 If necessary, click on a transfer job and select the required function

Export service 🗒 **ex**	Selecting a workstation (Sender)
Status	Display of status reports (mark job beforehand)
Pause	Interrupt/continue job
Scheduled	Display of jobs planned
Delete	Delete planned job
Completed	Display of jobs performed
Delete	Delete job performed from the 'Performed' list
Redo	Repeat performed job
Rejected	Display of rejected jobs
Status	Query status reports on a job
Redo	Repeat rejected job
Delete	Delete job from the 'Rejected' list
Status	Display of status report
Exit	Close window

10.2.6   ## Managing applications

With the help of package monitoring, you can stop active applications if the application you are currently working on becomes too slow. An application becomes active ('RUNNING') if it has been called up once.

Managing applications

1   Click 'Packages monitoring...' (see page 10-5).
   •   The following window appears.
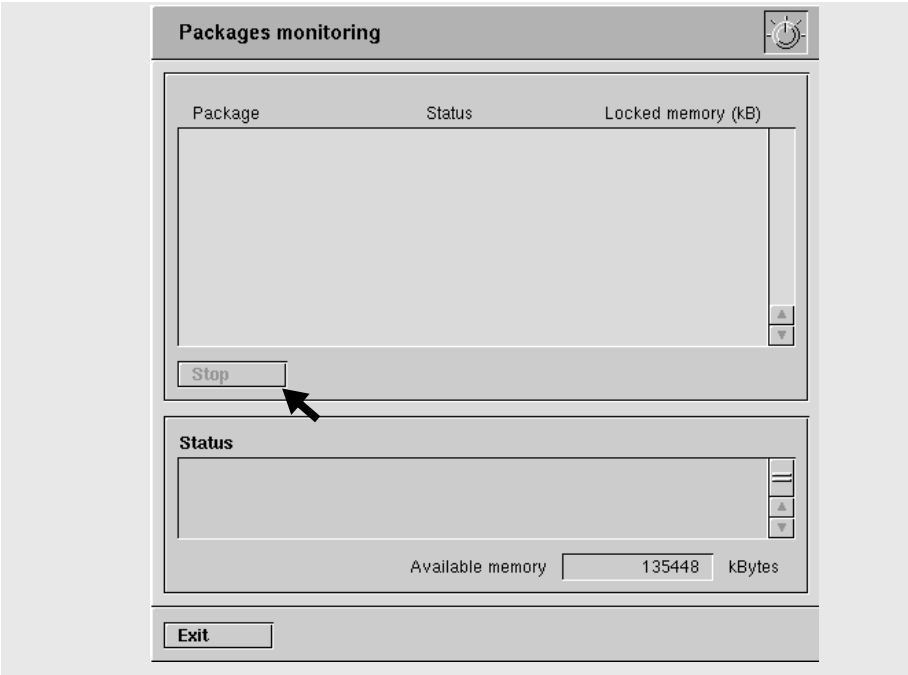
Fig. 10.9 'Packages monitoring' window

2   Select an application with the 'RUNNING' status that you would like to stop.

[Stop]   3   Click this button.

The selected application is stopped and receives the 'Stopped' status. The locked memory is released for other applications.

Package	Installed applications
Status	Display of statuses
RUNNING	Application already called up
IDLE	Application not yet called up
STOPPED	Stopped application (memory set to '0')
CRASHED	Programme error or crash
Locked memory (kB)	Reserved memory for an application in KB
Stop	Stop application
Status	Display of status reports
Available memory	Memory still available
Exit	Close window

Chapter 11   Customization   11-3

11   Customization

This section describes the functions in the 'Customization' window. For example, you will be given an explanation of how to set automatic erasure and how to define the standard application package.

Fig. 11.1 'Customization' window

11.1   Calling up the 'Customization' window

NOTE   *Setting the system parameters requires thorough knowledge of EasyVision technology. If necessary, ask your system manager or contact Philips Customer Service.*

Calling up the 'Customization' window

1   Click this symbol button.

• The following window appears.

2   Click the 'Exit' symbol.
   • The following window appears.

EASYVISION START UP MENU

What do you want to do?
1. Start Application
2. Start Customization
3. Go to Service Menu
4. Go to Installation/Configuration Menu

0. Shut down
Enter the number of your choice:

Fig. 11.2 Start menu

3   Enter '2' and press the Enter key.

• The following window appears.

Toolbar —————

Group field —————

Toolbar

	Close 'Customization' window, return to start menu
Save	Save changes
Restore PMS settings	Restores Philips factory settings (see page 11-7)
Adjust time...	Adjust time (see page 11-7)

Group fields

Protect incoming images	Set deletion conditions for incoming images (see page 11-8) This group field is deactivated for a client in a client/server configuration.
Automatic archiving	Set parameters for automatic archiving (see page 11-9), only activated for a connected archive
Destinations for remote functions	Set data transmission between acquisition, printing and storage systems (see page 11-9)
User permissions	(see page 11-9)
Default application package	The default application package appears after switching on (see page 11-12)
Automatic reconstruction	Detection of image series for reconstruction of an overview image (only for Bolus Chase, Spine and Colon applications, see Instructions for Use EasyVision RAD Software Options).
Print protocols	Edit print formats (print protocols) and create new ones (see page 11-13)
Automatic printing	Set detection of print formats for automatic printing (see page 11-15)

11.2   Exiting the customization window

N O T E   *Before exiting the customization window, you must save the changes you have made in the individual group field.*

Save

1   Click this symbol button,

– or –
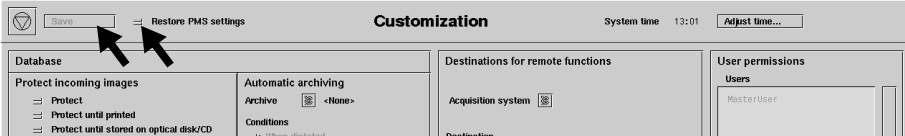
⊐ **Restore PMS settings**

1   click this option button if you wish to restore the default settings.

2   Then click this symbol button in the toolbar.
 • The following window appears.

EASYVISION START UP MENU

What do you want to do?
1. Start Application
2. Start Customization
3. Go to Service Menu
4. Go to Installation/Configuration Menu

0. Shut down
Enter the number of your choice:
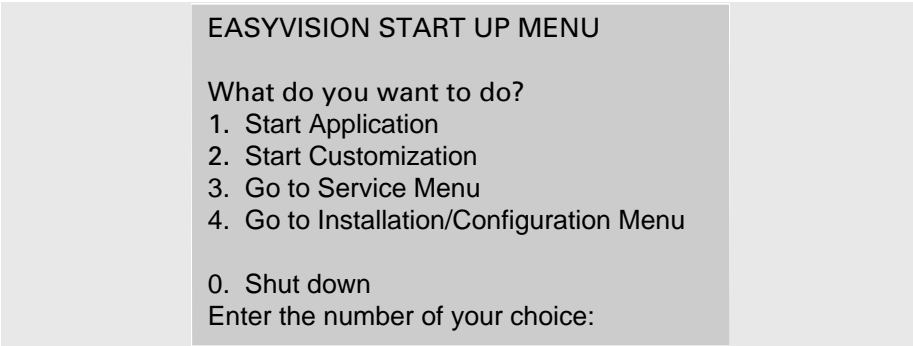
Fig. 11.3 Start menu

3   Select '1' and confirm with the Enter key.

The new settings are activated.

11.3 Restoring factory settings

If you have changed the pre-configured factory settings (PMS standard settings), you can restore them without using the service configuration program.

N O T E   *There is a particular process for restoring the factory settings of standard print protocols (see page 11-15).*

Only after clicking 'Save' are the factory settings displayed in the windows.

Restoring factory settings

1 In the upper function bar activate the 'Restore PMS settings' option.

2 In the upper function bar click on the 'Save' button.

Only after clicking on 'Save' will the settings be displayed in the windows.

11.4 Time

You can adjust the time for your workstation. The time can be adjusted for every workstation within an equipment group.

Adjusting the time

1 Click 'Adjust time' in the toolbar.
   • The following window appears.

Set time for local host

System time (HH:MM)   13:01

Proceed   Cancel
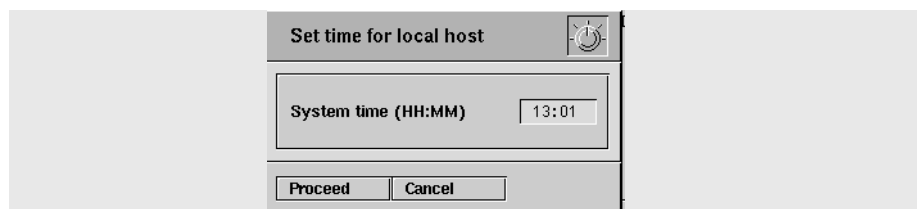
Fig. 11.4 Set time for local host' window

2 Enter the new time and confirm the entry with the Enter key.

11.5   Database

N O T E

- *For workstations without an internal database (clients), the functional feature described here is deactivated.*
- *The following conditions for erasure protection always apply to automatic erasure. Manual erasure of images is possible at all times irrespective of whether the erasure protection is set.*

You can set the deletion conditions for incoming images to reserve free storage space for new images. For further information on this topic refer to the section „Setting the deletion conditions" on page 9-29.

Setting deletion conditions

1   Select the required deletion conditions in the group field.

Protect	General deletion protection until manual deletion
Protect until printed	Protected until printed
Protect until stored on optical disk/CD	Protected until stored on an optical disk or CD
Protect until dictated	Protected until the 'dictated' (DIC) status has been reached (only in conjunction with EasyReview)
Protect until approved	Protected until the 'approved' (APP) status has been reached (only in conjunction with EasyReview)
Protect until archived	Protected until automatically archived
Protect during	Protected until all activated deletion conditions have been fulfilled and at least for the period of time indicated here.

Fig. 11.5 'Database' group field

11.6 Automatic archiving

N O T E   *This function is deactivated.*

11.7 Destinations for remote functions

N O T E   *In this group field, settings can only be changed if your EasyVision RAD workstation is coupled to an acquisition system (DSI, CT). In this case use the EasyVision Instructions for Use.*
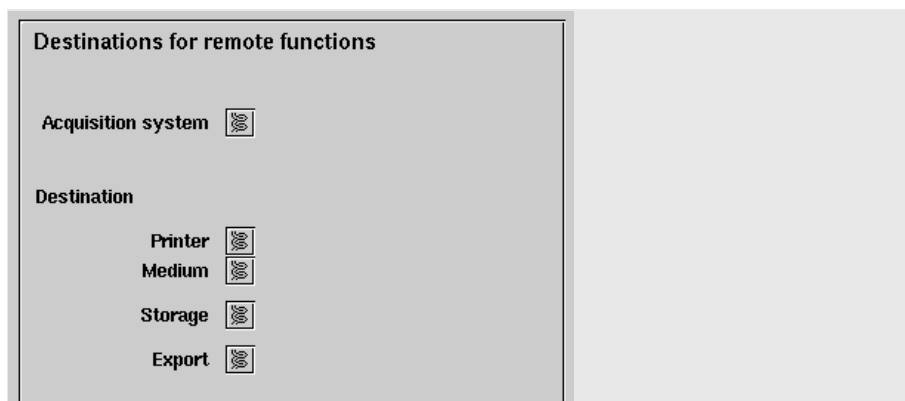
Fig. 11.6 'Destinations for remote functions' group field

11.8 User permissions

N O T E   *User profiles are defined only for the optional 'NetView' application.*

You can enter user profiles which permit specific users to work with the Internet Browser ('NetView'). To enter access authorisations, use the predefined default user (Master User). To do this, enter the user name and the password 'MasterUser'. The 'MasterUser' cannot be deleted; his rights can only be edited after changing the password (only via the Philips Customer Service).

Entering/changing user profiles

1 Click this button.

User permissions

Users
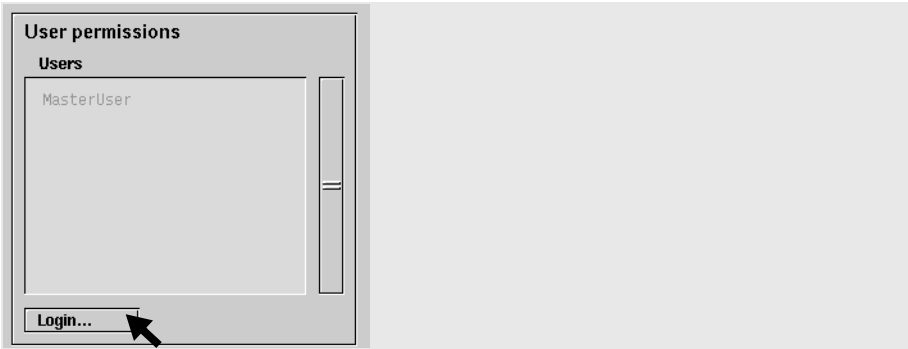
MasterUser

Login...

Fig. 11.7 'User permissions' window

• The following window appears.

Login permission

Username   MasterUser

Password

Login   Logout

Cancel
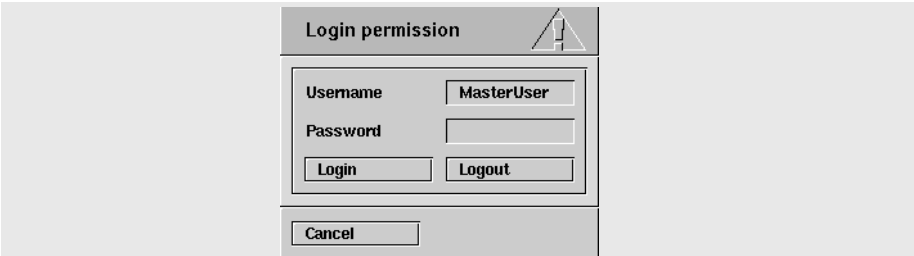
Fig. 11.8 'Login permission' window

2 Enter 'MasterUser' as the user name and password (use upper and lower case letters).

3 Then click 'Login'.
   • The following window appears.

User permissions

Add new user

User name:
Anonymous

Password:

Password (again):

Login required for:

⊐ User permissions
⊐ Easy review
⊐ WWW directory browser
⊐ NetView:
      whole database
      photo folders

Add   Reset

Registered users

Names:

MasterUser

Login required for:

⊐ User permissions
⊐ Easy review
⊐ WWW directory browser
⊐ Net view:
      whole database
      photo folders

Edit   Delete

Exit
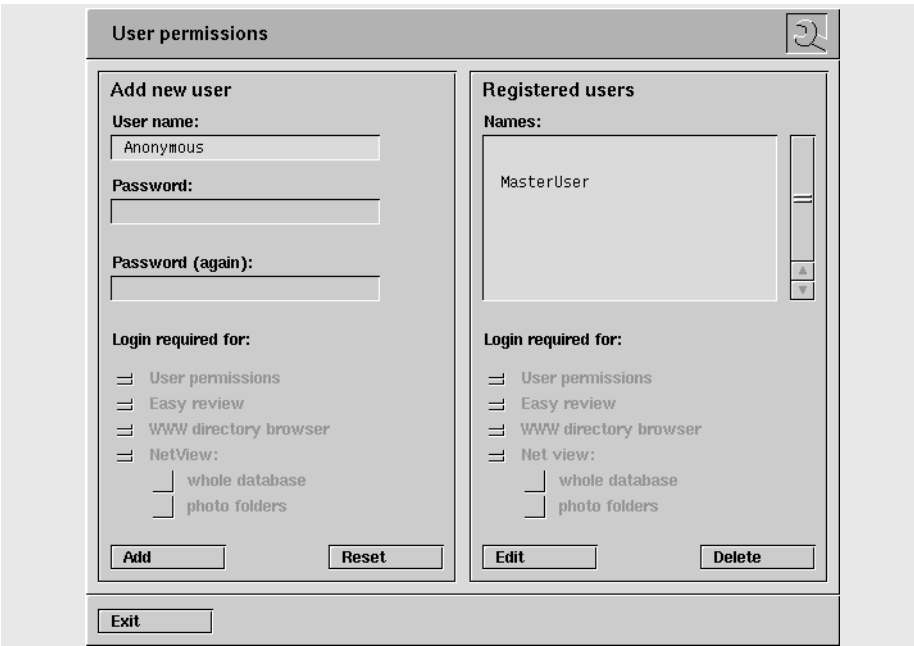
Fig. 11.9 'User permissions' window

4 Enter the new user profile or change an existing one.

Add new user	
User name	Enter new user name
Password	Enter password
Password (again):	As a control, enter password a second time
Login required for:	Determine permissions
Add	Add new user profile
Reset	Reset entries
Registered users	
Names	List of registered profiles.
Login required for:	Change permissions
Edit	Change user profile
Delete	Delete marked user profile

11.9   Default application package

Default application package means that application which is opened auto-matically after switching on the workstation. You can select the default appli-cation package on a server separately for each client. You can also determine a default application package on a client workstation. With differing settings on the server and client, the last selected application always applies.

Selecting a default application package

1   In the group field, select the workstation (workspot) for which you would like to determine a default application package.
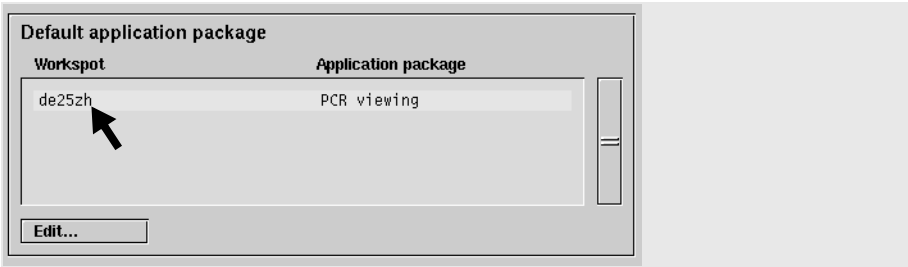
Fig. 11.10 'Default application package' group field

2   Then click 'Edit'.
  • The following window appears.
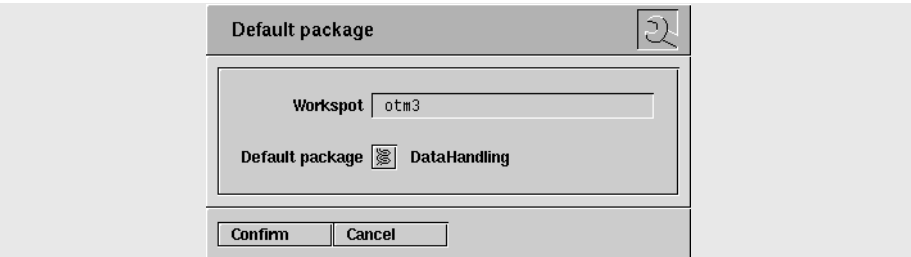
Fig. 11.11 'Default package' window
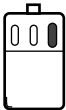
3   With the right mouse button, select the default application package from the list selection.

All applications are shown, even those which may possibly not be installed on the selected workstation. Select an application which is installed on the workstation.

4   Then click 'Confirm'.

11.10   Automatic reconstruction

N O T E   *In this group field, settings can only be made if your EasyVision RAD workstation is equipped with optional applications (e.g. Bolus Chase, Spine Reconstruction, Leg Measurements). In this case, please use the Instructions for Use for EasyVision.*
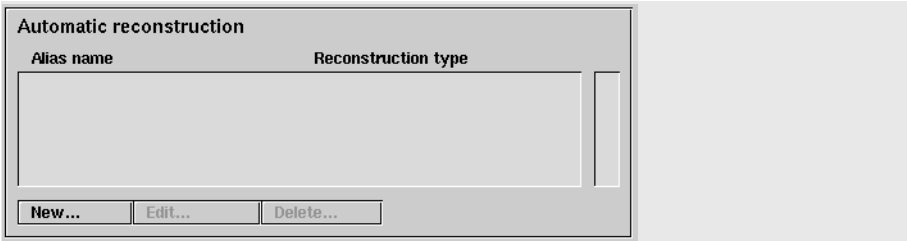
Fig. 11.12 'Automatic reconstruction' group field

11.11   Print protocols

Print protocols contain information on the arrangement and design of images and other elements on the film. They can be used for manual print jobs from the EasyVision RAD workstation or for automatic printing from the PCR terminal. To integrate new print protocols into the automatic printing, please notify the Philips Customer Service.

Standard print protocols are preset in the factory for various image types. You can edit, delete or copy a standard print protocol and use this as the basis for creating a new print protocol.
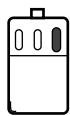
Creating/changing print protocols

1   With the **right** mouse button, select the 'PCR viewing' application from the list selection. To edit print formats from optional applications, please use the Instructions for Use for EasyVision.

Print protocols

Application package ▨ PCR viewing

	Name	Comment
New...	1on1-L	PMS
Copy...	1on1-L-rot	PMS
Edit...	1on1-P	PMS
Delete...	1on1-P-rot	PMS
	2on1-L	PMS
	2on1-L-rot	PMS
Push up	2on1-L-zoom	PMS
Push down	2on1-long-L	PMS
	2on1-long-P	PMS
	2on1-P	PMS
	2on1-P-rot	PMS
	2on1-P-zoom	PMS
	DiDiag-1on1-L	PMS
	DiDiag-1on1-P	PMS
	DiDiag-2on1-comp-L	PMS
	DiDiag-2on1-comp-P	PMS
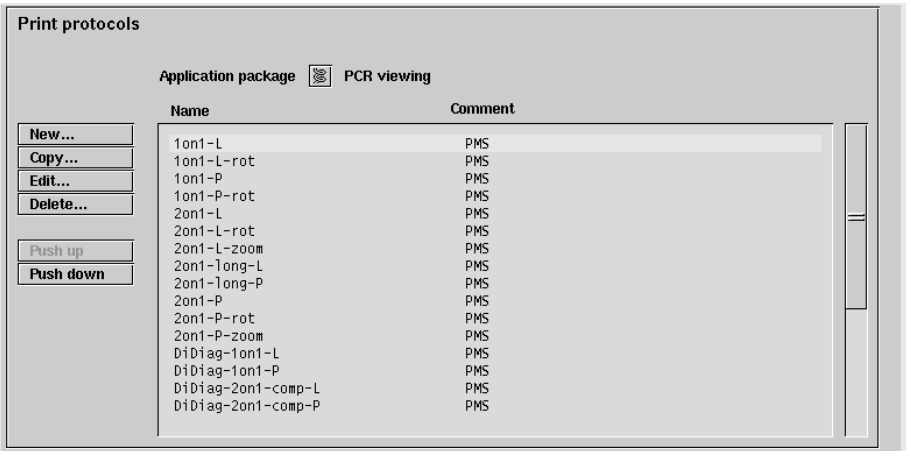
Fig. 11.13 'Print protocols' group field

2   Select a print protocol from the list and select a function ('New, 'Copy', 'Edit').
  • For all functions, the print format editor appears.

N O T E   *The print format editor can also be called up from the PCR application in the print dialogue. The functions in both cases are identical, with the exception of the 'Store' button. This does not appear in the 'Customization' window, as changes made here are saved in the toolbar with the 'Save' button. You can find further information regarding the functions in the print format editor under „Overriding print protocols" on page 8-22.*

11.11.1   Restoring standard print protocols

Standard print protocols are print protocols supplied by Philips with pre-configured factory settings. Standard print protocols can be recognised by the comment PMS standing for Philips Medical Systems. The standard print protocol factory settings, including the comment, can be changed by the user. You are able to restore standard print protocols to the factory settings. In this process all deleted standard print protocols are reloaded into the 'Print protocols' list. For further information on this topic refer to the section „Print protocols" on page 8-11.

Restoring standard print protocols

1   Delete those altered standard print protocols from the list which you wish to restore to the factory settings.

N O T E

- *The settings of the present print protocols will not be overwritten, therefore the standard print protocols concerned must be deleted beforehand.*
- *User defined print protocols will not be reloaded.*

2   Click the 'Save' button in the upper toolbar and leave the 'Customization' window.

3   Reopen the 'Customization' window and click 'Restore PMS settings' in the upper toolbar, continue by clicking 'Save'.

4   Select the application package 'PCR viewing'.

This list contains the undeleted standard print protocols with the old settings, the user-defined print protocols as well as the newly loaded standard print protocols at the end of the list.

11.12   Automatic printing

N O T E   *In this group field, settings can only be made if your EasyVision RAD workstation is coupled to a radiography system (DSI, CT). In this case, use the Instructions for Use for EasyVision.*
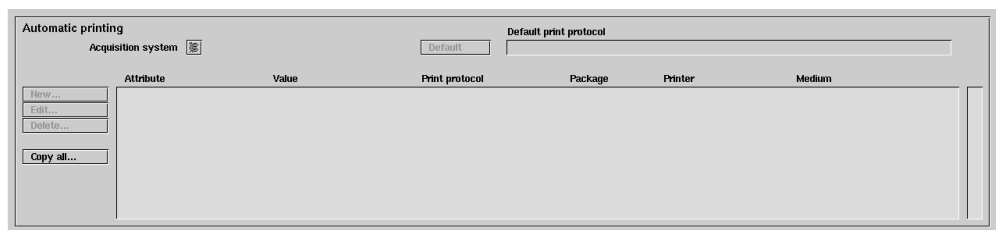
Fig. 11.14 'Automatic printing' group field

Chapter 12

Maintenance 12-3

12   Maintenance

As with any technical appliance this X-ray equipment also requires

- proper operation,
- regular testing by the user,
- regular service and repair.

By taking these precautions you maintain the operability and operational reliability of the system. As the user of the unit you are obliged according to accident prevention regulations, the medical products law and other regulations to take such precautions.

Maintenance consists of tests which the user can perform and maintenance which is performed under service agreements, Philips service orders or by persons explicitly authorised to do so by Philips.

12.1   Tests and inspections by the user

The user must check the equipment for apparent defects according to the table. If performance defects or other departures from normal behavior occur, the user must switch off the equipment and inform the Service Organization. He may resume operation of the equipment only when the defects have been remedied. Operation using defective components may lead to an increased safety risk.

Interval	Scope	Method
Once a day	Defective indicator lamps, damaged components, labels and warnings	Inspection
Once a week	All cables and sockets (damage/breakage)	Inspection
Monthly	Cleaning the image plates	Inspection

12.2   # Safety checks according to the Medical Products Law

The safety checks cover operability and operational reliability. They must be performed at least every 2 years. These tests constitute part of our preventive maintenance under our service agreements.

They cover

- visual checking for completeness and apparent damage or defects as well as soiling, sticking parts and wear and tear which may affect safety,

- testing the necessary monitoring, safety, display and indicating systems,

- measuring the safety-relevant output parameters,

- for the particular product other special technical tests according to the generally accepted standards of engineering practice,

- other necessary tests specified by the manufacturer.

12.3   Maintenance

Technical medical systems contain mechanical components which are subject to wear and tear during normal operation. The correct setting of electro-mechanical and electronic components affects operation, image quality and electrical safety.

Philips recommends you to

- perform the tests indicated in the table on a regular basis,

- have the equipment serviced by the Philips Service Organisation at least once a year.

- By entering into a service agreement with Philips you retain the value and safety of your equipment. All the necessary maintenance, including the safety tests for the purpose of preventive avoidance of danger and the necessary settings for optimum image quality and minimum exposure to radiation, are performed at regular intervals. Philips agrees on these intervals with you, taking the legal requirements into account.

Repairs

⚠

WARNING

Faulty components which affect the safety of the X-ray equipment must be replaced by genuine spare parts.

Recording results

Service and repairs must be entered in the medical products logbook, including the following data:

- type and scope of work,

- if necessary, details of any changes to ratings or the working zone,

- date, person performing the work, signature.

-

Chapter 13   Technical data 13-3

General data 13-3

Labels 13-4

13   Technical data

13.1   General data

Feature	Specifications
Workstation	
Type	SUN Ultra 10/Sun Blade 1000/2000
Operating system	Solaris 2.8
For precise technical data please refer to the relevant computer instructions for use.	
Ambient conditions	
In operation	Temperature: + 15°C to + 30°C Rel. humidity: 40% to 80%, no condensation
For storage and transport	Temperature: 0°C to + 45°C Rel. humidity: 10% to 90%, no condensation
Power supply	
Mains voltage	100 V to 120 V ± 10% or 200 V to 240 V ± 10%
Mains frequency	50 Hz/60 Hz
Nominal power	1.0 kVA

13.2   Labels

The following labels can be found on the base plate of the EasyVision RAD computer. The diagram of the computer housing is to be regarded as an example.
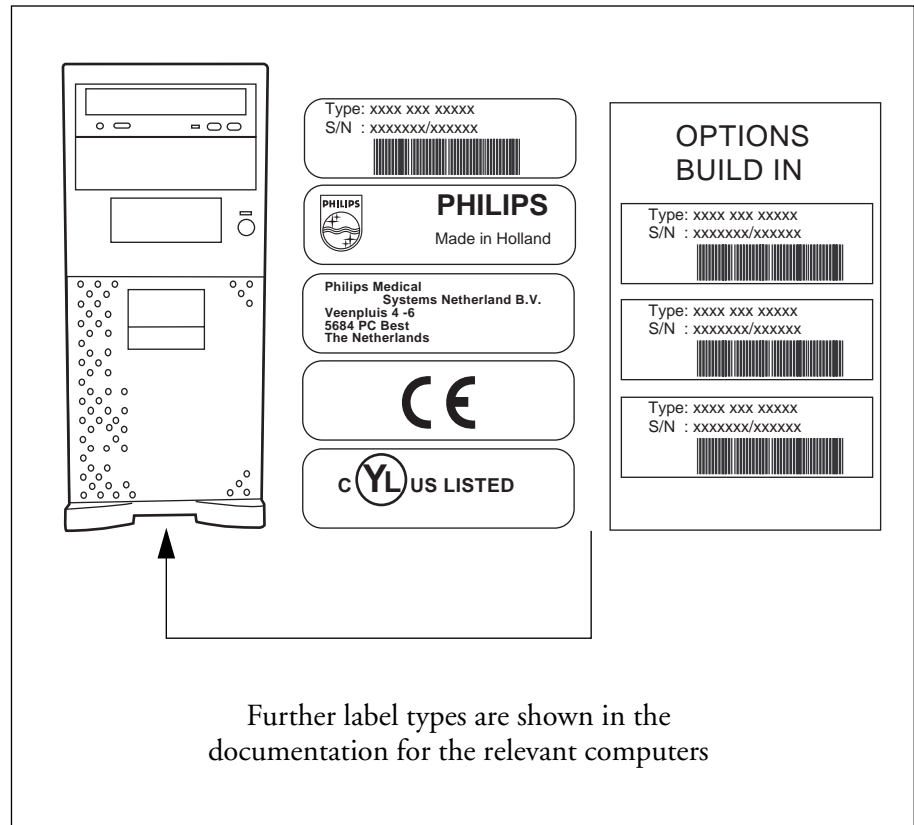
Fig. 13.1 Labels

Glossary

Application

In the standard version, the EasyVision RAD workstation includes the "PCR" application and "Data handling". Other optional applications, such as "Bolus Chase" are available. An application is an independent group of specific functions for the presentation and processing of images of a modality.

Modality

Modality means a digital image type which has been produced or a specific radiography system, e.g. "CR" = Computed Radiography.

MRM code (menu code)

Identifies a parameter set for the reading process on the plate reader depending on the examination type carried out.

Print protocols (print formats)

Print protocols contain the individual parameters for film design.

LUT (Lookup Table)

Grey level table which assigns a specific grey level for presentation to the grey level of a pixel. With the help of the LUT, the contrasts and grey scale scope can be edited, for example.

RIS

Radiology Information System; central data input and administration station for radiology.

THORAVISION

Pulmonary X-ray unit from Philips Medical Systems

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14   Appendix A: special characters

If your EasyVision RAD workstation is not equipped with a national SUN® keyboard, you can create the following special characters in text windows using the "Compose" key.

14.1   Creating special characters

Press and release the "Compose" key. The "Compose" key lights up. Now create the following characters.

14.1.1   Spanish special characters

Sp. Character	Key 1	Charac. 1	Charac. 2	Sp. Character	Key 1	Charac. 1	Charac. 2
á	Compose	a	Accent grave (´)	Ñ	Compose	Ñ	~
Á	Compose	A	Accent grave (´)	ó	Compose	o	Accent grave (´)
é	Compose	e	Accent grave (´)	Ó	Compose	O	Accent grave (´)
É	Compose	E	Accent grave (´)	ú	Compose	u	Accent grave (´)
í	Compose	i	Accent grave (´)	Ú	Compose	U	Accent grave (´)
Í	Compose	I	Accent grave (´)	¡	Compose	!	!
ñ	Compose	n	~	¿	Compose	?	?

14.1.2   French special characters

Sp. Character	Key 1	Charac. 1	Charac. 2	Sp. Character	Key 1	Charac. 1	Charac. 2
à	Compose	a	Accent aigu (`)	É	Compose	E	Accent grave (´)
À	Compose	A	Accent aigu (`)	è	Compose	e	Accent aigu (`)
â	Compose	a	^	È	Compose	e	Accent aigu (`)
Â	Compose	Â	^	ê	Compose	e	^
ç	Compose	c	comma (,)	Ê	Compose	E	^
Ç	Compose	C	comma (,)	î	Compose	i	^
é	Compose	e	Accent grave (´)	Î	Compose	I	^

14.1.3   German special characters

Sp. Character	Key 1	Charac. 1	Charac. 2	Sp. Character	Key 1	Charac. 1	Charac. 2
ä	Com-pose	a	‖	ü	Com-pose	u	‖
Ä	Com-pose	A	‖	Ü	Com-pose	U	‖
ö	Com-pose	o	‖	ß	Com-pose	s	s
Ö	Com-pose	O	‖				